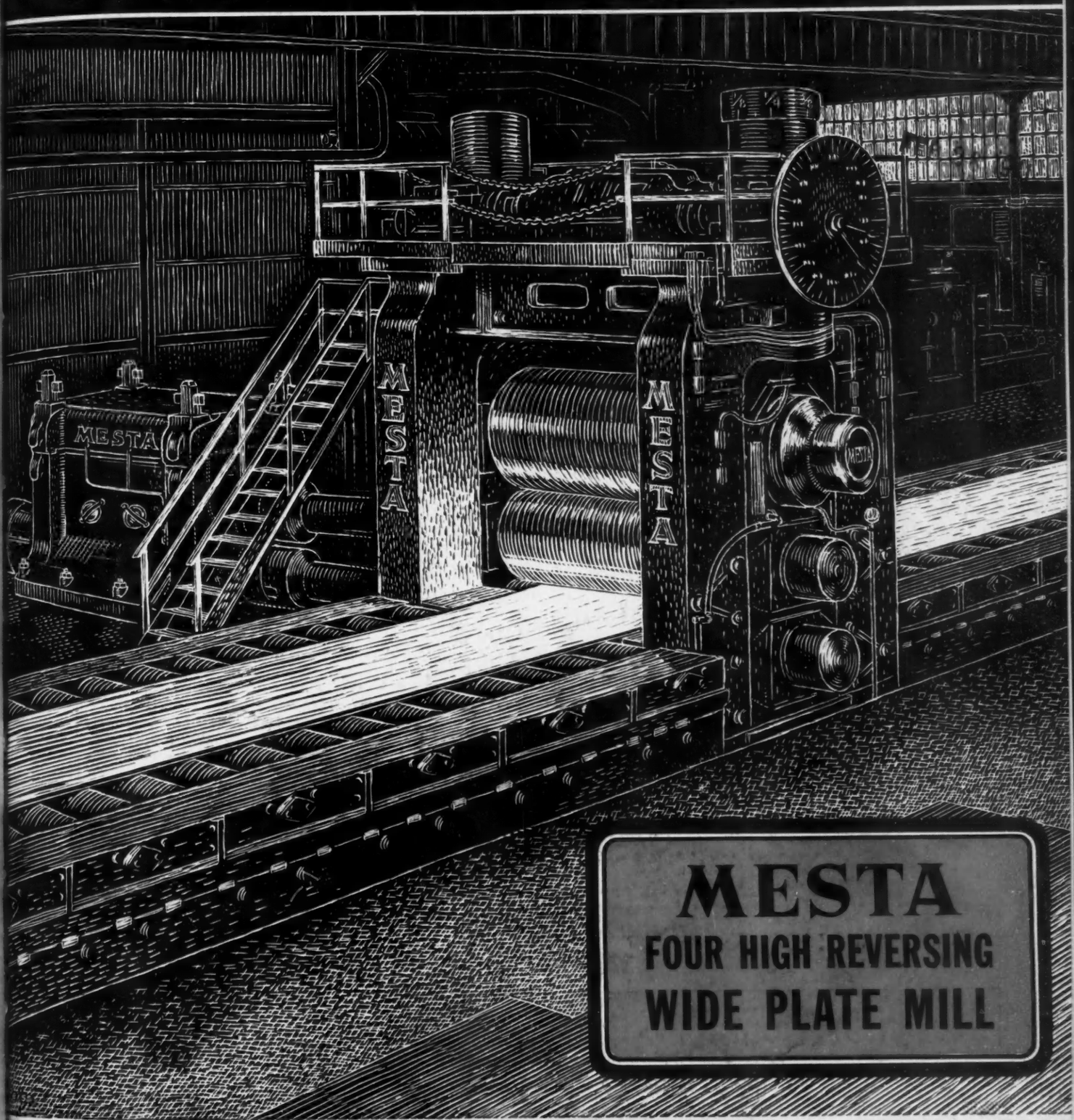
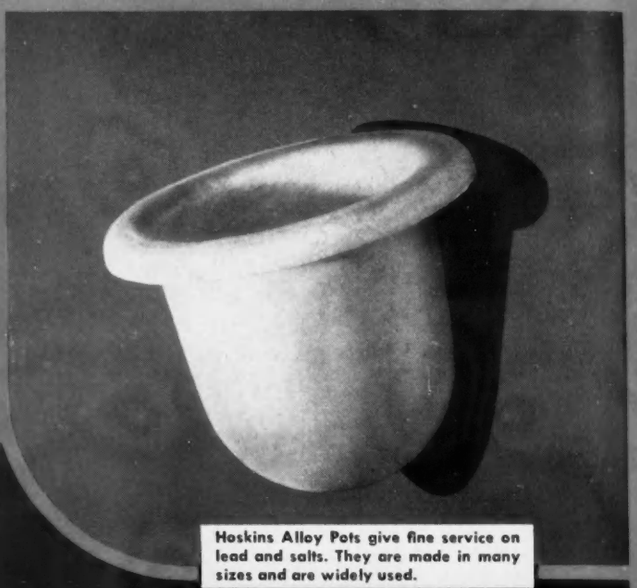
EBRUARY 27, 1941

The IRON AGE



This Lead Pot is being used to heat-treat the various tools used by the Maintenance Department of a power company.



Hoskins Alloy Pots give fine service on lead and salts. They are made in many sizes and are widely used.

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These two Hoskins Pot Furnaces are in a metallurgical laboratory of the automotive industry. The plant has them by the dozen.

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Chromel
NICKEL-CHROMIUM

This Week in The Iron Age

FEBRUARY 27, 1941

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The Iron Age

FEB. 27, 1941

ESTABLISHED 1855

Sixty Days to Go

I AM a firm believer in the American System of Enterprise. I think that the country as a whole, and the average man in it, has a better chance under our system of capitalism than under any other system in the world.

But sometimes I wonder just who it is that is doing the most effective work in undermining this system.

The Communists have done what they could, of course, to upset it, but all of that has been set at naught since Herr Hitler swore blood brotherhood with Joe Stalin.

The parlor pinks of America who did not know what to do with inherited money and the kitchen pinks (or sinks) who knew a meal ticket when they saw one have also done their bits at subterranean undermining, but their holes caved in when the young communists paid for their dinner by sticking their tongues out at the President.

That leaves the chief position of public enemy of the American System in the hands of that small minority of employers whose eyes are set so close together that all that they can see is the dollar sign and who overlook completely their custodianship of men and women who have helped to build their businesses.

Today, I am going to tell you about such a man. A true story.

This gentleman was the employer of Jim Jones. We'll call him that anyway.

Jim entered the employ of this company, a prosperous one making luxury goods for the luxury trade, 49 years and 10 months ago at the age of 16. His ambition was a comparatively modest one. He was satisfied with his pay of $21 per week, but he wanted to round out 50 years of service.

Jim must have given fairly satisfactory service, or his employers would not have kept him for 49 years and 10 months. But six weeks ago he was fired. Just 60 days to go.

Jim went home and broke the news to his family. And the next week he died.

The doctor's report read "died of coronary thrombosis". But his family and friends knew differently. They knew it was from a broken heart.

Jim's employer, through his ignorance and indifference, struck a harder blow at capitalism than have any dozen parlor pinks or any half-dozen outright reds. For Jim's friends and relatives will judge employers as a class by this miserable exception. And they will forget the overwhelmingly larger number who prize long service and protect it.

Sixty days to go. Two months more of pay at $21 per week, a testimonial dinner that would cost perhaps $75 and a few kind remarks would have sent Jim home happy. He was about ready to quit anyway, but after 49 years and 10 months, the blue ticket was a shock. It was the first time he had been fired.

And as it turned out, it was the last time, too!

Hundreds of precision instruments, similar to these at the blast furnaces, help assure Inland quality and uniformity

Featherweight Fingers Help Maintain INLAND Quality

LOCATED near the base of each towering Inland blast furnace are control instruments on which featherweight fingers trace delicate ink lines. Every line on the charts is a record essential to the daily production of thousands of tons of Inland Quality Pig Iron.

Attendants closely watch these precision instruments, which continually indicate blast furnace operating efficiency, and prove a great aid in obtaining pig iron of the uniformity and quality demanded by Inland. At the end of each day the charts are sent to the plant office, where they are thoroughly studied and analyzed.

The use of precision instruments is an old story in the Inland Plants, where many developments of this kind have been pioneered. Today, modern control instruments are used not only at the Inland blast furnaces, but at the open hearths, soaking pits, reheating furnaces, rolling mills—wherever steel is made, heated and worked.

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Aluminum Castings for Aircraft

—The types, properties and uses of commercial sand casting alloys employed in aircraft structures.

By NORMAN E. WOLDMAN, Ph.D.

Chief Metallurgical Engineer, Eclipse Aviation Division of Bendix Aviation Corp., Bendix, N. J.

ALUMINUM, next to magnesium, is the lightest of today's commercially used metals. In the unalloyed state, aluminum may be too weak for many applications—but, when alloyed with other elements, it becomes most suitable for use in aircraft.

The constant demand through the development of the aircraft industries has been for stronger and lighter alloys. Aluminum and its alloys were introduced extensively during the early stages of the aircraft industry. Due to the low density, high mechanical strength and great durability of aluminum alloys, appreciable savings in weight were obtained. The fuselage, the wings, the tail, the rudder, the propeller and many of the engine parts and accessories are made of wrought, cast and forged aluminum alloys.

In an earlier paper[1] the author discussed the subject of magnesium in aircraft. In this present article it is desired to discuss the subject of aluminum in aircraft but to limit the subject to castings only. In a subsequent paper the subject of wrought and forged aluminum in aircraft will be thoroughly considered.

The most striking quality of commercial aluminum alloys[2] among their many useful properties, is the fact that they weigh about one-third as much as most other commonly used metals and alloys. Combined with low specific gravity are such properties as high resistance to the corrosive action of the atmosphere and to a great variety of chemical compounds; high thermal conductivity; high electrical conductivity; excellent machining characteristics; and susceptibility of certain alloys to heat treatment for improved strength and hardness. However, as is the case with all castings, aluminum alloy castings have somewhat inferior mechanical properties, shock resistance, and ductility to those obtainable with the wrought alloys. In aircraft structures the strength per unit weight is the criterion of the value of a material; therefore, the heat treated wrought aluminum alloys are of the greatest importance, as they possess mechanical properties comparable with those of structural steels. In selecting the alloy to be used for any application, it is necessary to consider the primary service requirements which may be any one or a combination of the following: strength and ductility, strength at elevated temperature, pressure tightness, corrosion resistance, ease of casting due to complicated shape, low cost, etc.

The relative densities of aluminum and other aircraft metals and alloys are shown in Table I. It will be observed that aluminum is 50

[1] N. E. Woldman, Metals and Alloys, October, 1940.

[2] Alcoa Aluminum and Its Alloys, Aluminum Co. of America publication.

per cent heavier than magnesium but is about one-third of the weight of iron and steel, and less than one-third of the weight of copper alloys.

A true appreciation of the characteristics of aluminum alloys and their suitability for aircraft structures, requiring maximum strength and endurance with a minimum weight, is obtained when their properties are compared with those of other commercial metals. Table II shows the comparative properties of a heat treated cast aluminum alloy versus other metals for equal volume relations; while Table III shows the comparative properties of a heat treated cast aluminum alloy versus other metals for equal weight relations.

Types of Castings

Aluminum casting alloys may be classed in four groups as follows:

1. Sand castings
2. Permanent mold castings
3. Die castings
4. Plaster mold castings

The sand casting and permanent mold casting group of alloys may be further sub-divided into non-heat treatable and heat treatable alloys; that is, one in which the improvement in properties is accomplished by alloying alone, and the other in which heat treatment processes are used to enhance further the mechanical properties. The type of casting process[2] which is used will depend upon several factors. For large or for intricate cored castings, the use of sand molds is necessary. Because a metal mold or steel die is required, the use of die and permanent mold castings can be considered only where a sufficiently large number of castings of the same pattern will be used to justify the cost of the mold or die. The die casting process is particularly adapted to the quantity production of relatively small castings in which close dimensional tolerances are required and the cost of finishing must be held to a minimum. The dimensional tolerances of permanent mold castings are intermediate between those of sand castings and those of die castings, and the surface finish approaches that of die castings. Plaster mold castings are similar to sand castings but with smoother surface and closer tolerances. Certain alloys, heat treatable and non-heat treatable types, can be cast in plaster molds.

Casting Alloys

By the addition of various alloying elements[2] or "hardeners" to aluminum, not only its tensile strength, but casting properties as well, are improved. By alloying alone, strengths almost double that of commercially pure aluminum are obtained, and the increase in strength is gained at a sacrifice of most of the ductility of the parent metal. The elements commonly used as hardeners are copper, silicon, magnesium, zinc, manganese, nickel and iron. The properties of the alloys vary, depending within certain limits upon the element or elements which are added and upon the percentages used.

Castings permit better distribution of metal to resist shock than do built-up wrought structures. Castings have better properties than many wrought alloys at elevated temperatures.

The various types of aluminum casting alloys are as follows:

SILICON-ALUMINUM ALLOYS:

Silicon-aluminum alloys are very fluid, have excellent casting characteristics, and are thus used for thin-wall and complicated castings. The castings are very dense and leak proof. They have a lower specific gravity than other aluminum alloys and have good corrosion resistance. However, silicon-aluminum alloys have inferior machining characteristics because of the tendency of tools to drag the surface. They have lower yield strength-tensile strength ratio than copper-aluminum alloys, but in many cases they have higher impact resistance and ductility. These binary silicon-aluminum alloys are not suitable for high temperature applications.

COPPER-ALUMINUM ALLOYS:

Copper-aluminum alloys respond to heat treatment and, therefore, have high strength and hardness.

TABLE I

Relative Densities of Various Commercial Metals

	Specific Gravity	Lb. Per Cu. In.
Magnesium	1.8	0.065
Aluminum	2.7	0.101
Zinc	7.1	0.256
Cast iron	7.2	0.260
Steel	7.9	0.285
Stainless steel	7.92	0.286
Brass	8.5	0.307
Bronze	8.8	0.318
Monel	8.9	0.323
Copper	8.9	0.323

TABLE II

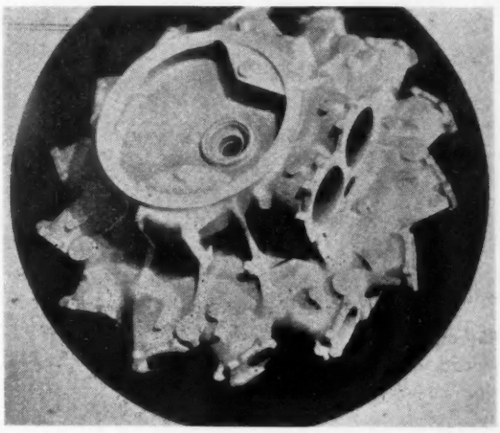
Comparative Properties of a Heat Treated Aluminum Alloy vs. Other Metals—Equal Volume Relations

	Relative Weight	Tensile Strength	Elongation, Per Cent	Fatigue Endurance Limit in Bending
Mild steel	4.4	60,000	30	30,000
Alloy steel	4.4	100,000	20	50,000
Aluminum alloy, cast, heat treated (Alcoa 220-T4)	1.6	45,000	14	7,000
Aluminum alloy, wrought, heat treated (Alcoa 24 ST)	1.6	68,000	20	18,000
Magnesium alloy, cast, heat treated (Dowmetal-H)	1.0	33,000	10	9,000
Magnesium alloy, wrought, heat treated (Dowmetal-E)	1.0	42,000	12	14,000

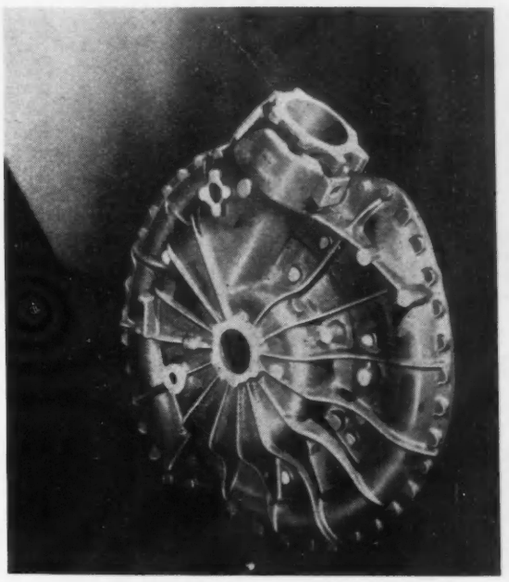
TABLE III

Comparative Properties of a Heat Treated Aluminum Alloy vs. Other Metals—Equal Weight Relations

	Relative Weight	Tensile Strength
Mild steel	4.4	60,000
Alloy steel	4.4	100,000
Aluminum alloy, cast, heat treated (Alcoa 220-T4)	4.4	123,000
Aluminum alloy, wrought, heat treated (Alcoa 24 ST)	4.4	188,000
Magnesium alloy, cast, heat treated (Dowmetal-H)	4.4	145,000
Magnesium alloy, wrought, heat treated (Dowmetal-E)	4.4	185,000

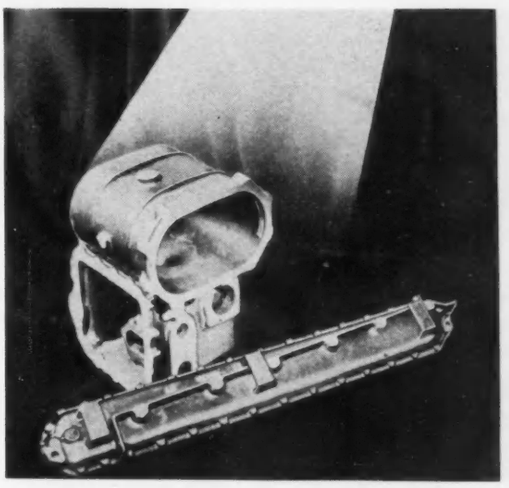


A VOLUTE sand casting in aluminum alloy for the Bristol aircraft engine. (Bristol Airplane Co., Ltd.)



A SAND cast aluminum rear supercharger casing for Napier "Dagger" aircraft engine.

A GROUP of sand cast aluminum crankcases for the Pratt & Whitney aircraft engine.

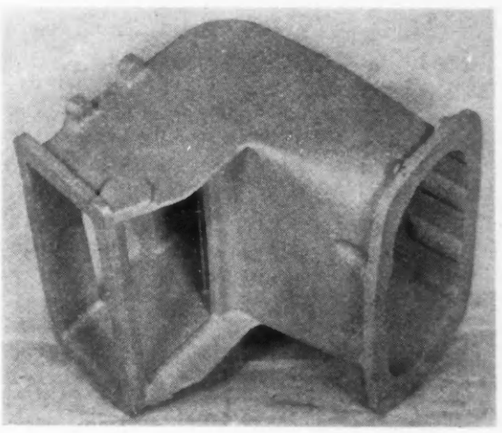


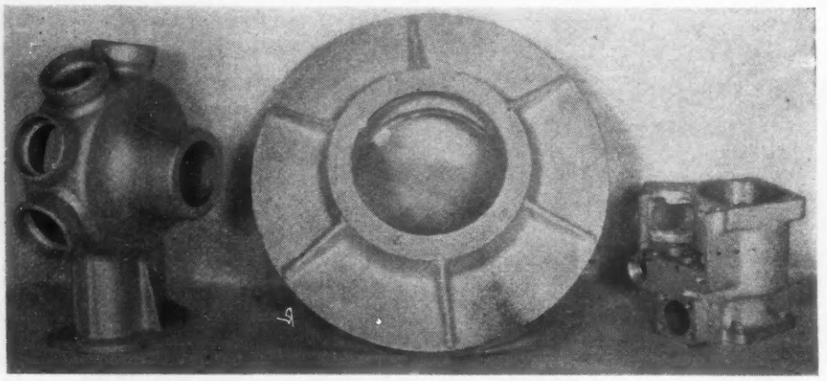
SAND cast aluminum oil pump and cam shaft casing cover for Napier "Dagger" engine.

o o o

LEFT

A SAND cast air carburetor preheater made from Alcoa 195 (Eclipsaloy 38A-ST).





AT LEFT—Sand cast heating system valve made from Alcoa 195 (Eclipsaloy 38A); (center) sand cast mounting spinner for anti-icing unit made from Alcoa 195 T4; (right) sand cast pump housing made from Eclipsaloy 38A-ST.

These alloys are not used for very thin sections and the castings are not as pressure tight as castings of the silicon-aluminum alloys. They possess a desirable combination of good casting characteristics and good machinability.

COPPER-SILICON-ALUMINUM ALLOYS:

Copper and silicon when added together to aluminum make the alloys particularly suitable for permanent mold and die casting applications because of their excellent casting characteristics. They can be used for large and intricate sand castings. Their limitations are two fold, namely, they are not as resistant to impact as the simple heat treated binary copper-aluminum alloys, and they are less corrosion resistant than the simple silicon-aluminum alloys. However, these ternary alloys have a wide application since they respond well to heat treatment, producing excellent mechanical properties. They are leakproof, pressure tight and retain strength up to 400 deg. F. They can be used, nevertheless, above 400 deg. F. This group of alloys attempts to combine the casting characteristics of the silicon-aluminum alloys with the mechanical properties and machining characteristics of the copper-aluminum alloys.

MAGNESIUM-ALUMINUM ALLOYS:

Magnesium-aluminum alloys are difficult to cast, but they have maximum resistance to corrosion. These alloys have lower specific gravity and excellent mechanical properties. Their machinability is good, and they take and maintain a white polish. Alloys containing magnesium in suitable proportions as the hardener are even more resistant to corrosion than those containing silicon, especially against high octane aviation gasoline.

MAGNESIUM-COPPER-ALUMINUM ALLOYS:

These alloys are excellent heat treatable alloys; magnesium added to the binary copper aluminum alloys increases the response of these alloys to heat treatment, especially the full solution plus aging treatment, with resulting increase in hardness and strength with sacrifice of ductility.

NICKEL-MAGNESIUM-ALUMINUM ALLOYS:

Nickel with magnesium in aluminum alloys is very effective in maintaining the high properties at elevated temperatures and in providing an alloy not subject to permanent growth on heating. These alloys retain strength up to 600 deg. F. They respond well to heat treatment and become very hard after complete aging following the solution treatment.

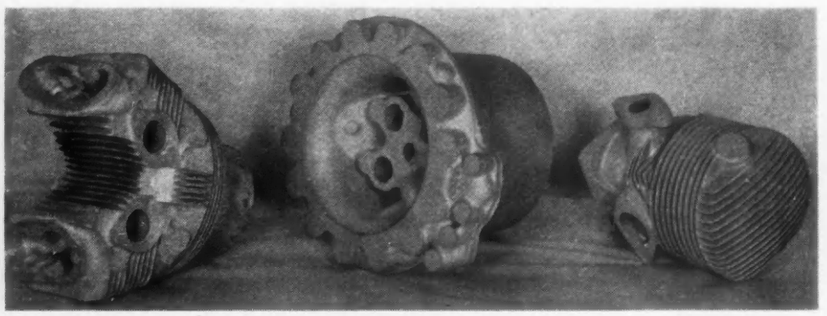
Sand Castings

Sand casting of aluminum alloys is the method most frequently resorted to in obtaining castings for aircraft construction. Wood patterns are frequently used, but metal patterns are desired where there is quantity production. There is practically no limit to the size or core complexity of castings made by this method. Such foundry considerations as section thickness, gating, risering, chilling, pouring temperature, permeability and moisture content of the sand, and any other factors which influence the rate of metal solidification, have a material effect on the mechanical properties of the castings.

Cast aluminum alloys have low strength at temperatures just after solidifying and, if free contraction of the metal is not permitted, cracks may be produced in the castings. Therefore, the sand molds must be relatively soft, and cores must soften at low temperatures in order to obtain sound castings. The low specific gravity of the aluminum alloys makes extra venting necessary so that all gases can be moved rapidly from the molds. Either dry or green sand cores are used.

Sand casting alloys may be cast in the smaller castings with $\frac{1}{8}$-in. minimum wall thickness. The usual allowance for machining is 1/16 in. The shrinkage allowance for patterns is 5/32 in. per ft.

The normal aircraft sand casting alloys are known in the trade as Alcoa 43, Alcoa 47, Alcoa 142, Alcoa 195, Alcoa 214, Alcoa 220, Alcoa 355, Alcoa 356 and their



AT LEFT—Sand cast auxiliary engine cylinder head made from Eclipsaloy 4A-STA; (center) sand cast Diesel aircraft engine cylinder head made from Eclipsaloy 4A-STA; (right) sand cast one-cylinder auxiliary engine cylinder head made from Eclipsaloy 4A-STA.

A.S.T.M. or S.A.E. equivalents. Other manufacturers use their own trade names for these alloys.

A listing of typical sand casting alloys is shown in Table IV, and the same table shows the physical properties of these alloys, as well as the various commercial equivalents.

The uses and characteristics of these sand casting aluminum alloys are shown below:

Alcoa 43 (Eclipsaloy 35):

Alloy of low tensile and low yield strength. Due to its high fluidity it is used for complicated and thin walled castings. It is dense, leakproof, and has good corrosion resistance. It is used for carburetors, hot air scoops, fuel line fittings, fuel and oil tank flanges, oil pans, gear case covers and accessory housings.

Alcoa 47:

An alloy of higher silicon content than Alcoa 43 with subsequent higher strength when modified. It is the lightest and most fluid of all the aluminum alloys, but is more difficult to machine and tap. Its uses are the same as for Alcoa 43 but for thinner walled and more complicated castings, and also for castings requiring higher mechanical properties.

Alcoa 122:

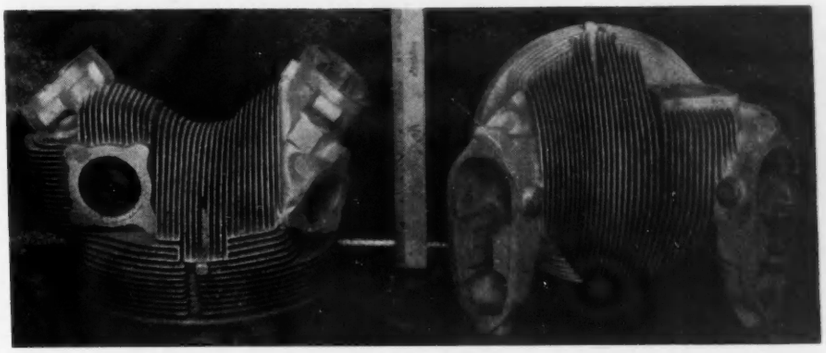
This is a heat treatable alloy used for parts subject to high temperature and requiring high hardness and strength. It is used for pistons, carburetors, intake manifolds, bearing surfaces and air-cooled cylinder heads.

Alcoa 142 (Eclipsaloy 4):

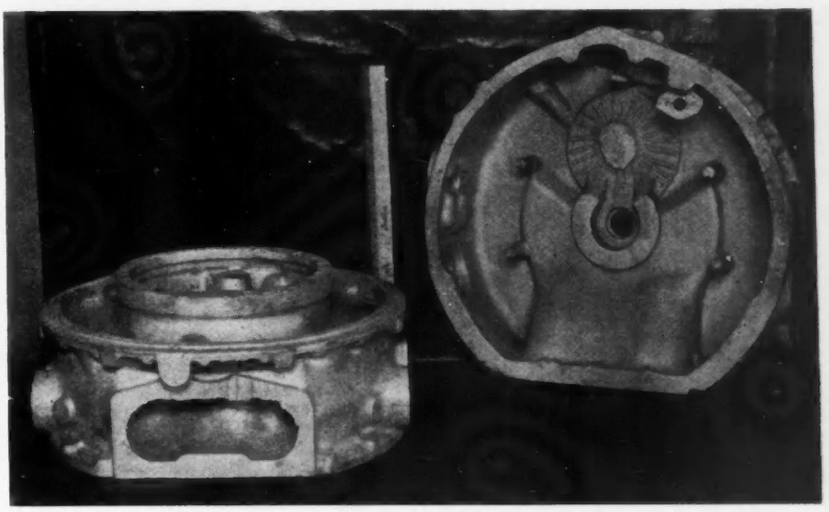
This is a heat treatable alloy known also as "Y" alloy. It maintains its strength well at elevated temperatures up to 600 deg. F. It is used for cylinders, air-cooled cylinder heads, pistons and bearing surfaces.

Alcoa 195 (Eclipsaloy 38):

This is one of the most commonly used heat treatable alloys having good strength and high shock resistance. It is not as corrosion resistant as the silicon-aluminum alloys, but machines better and has greater strength. It is used for most structural castings, gear cases, crankcases, gear housing, oil pans, controls, rudder pedals, sockets, horns, some cylinder heads, propeller gear boxes, superchargers, transmission gear cases

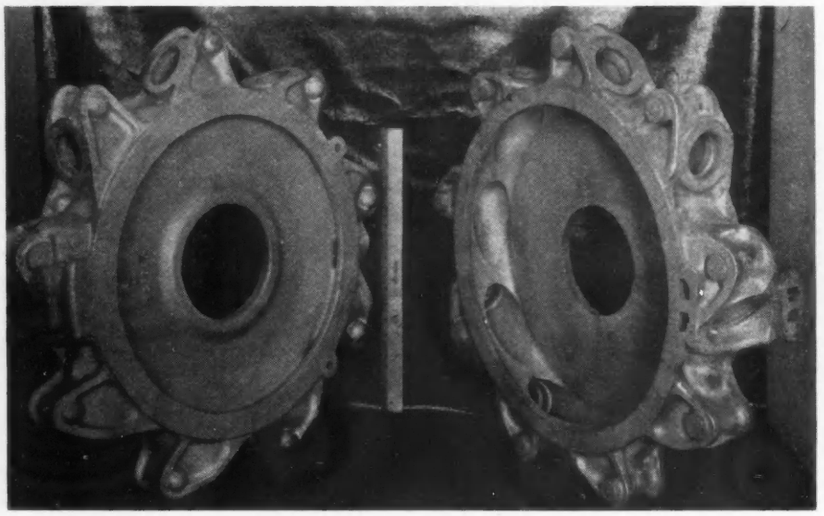


SAND cast Wright Cyclone engine cylinder head made from "Y" alloy.



SAND cast rear supercharger housing made from Alcoa 355.

WRIGHT engine diffuser section sand casting made from Eclipsaloy 322A (Alcoa 355).



WRIGHT engine intake section sand casting made from Alcoa 355.

and covers for dirigibles, and also starter and generator housings.

Alcoa 214 (Eclipsaloy 320):

This alloy does not respond to heat treatment. It is more difficult to cast than the Cu-Al and Si-Al alloys and is not recommended for intricate or leak-proof castings. It has excellent corrosion resistance, high ductility, and strength intermediate between Alcoa 43 alloy and the heat treated alloys. It is used for housings and parts of simple design requiring high corrosion resistance.

Alcoa 220 (Eclipsaloy 324):

This is a heat treatable alloy of excellent resistance to corrosion, especially to high octane aviation gasoline. It is not recommended for

TABLE IV

Composition, Physical Properties and Commercial Equivalents of Sand Casting Alloys

Composition (Typical):

	Cu	Si	Fe	Mg	Ni	Al
Alcoa 43	...	5	...	...	...	balance
Alcoa 47	...	12.5	...	...	...	balance
Alcoa 122	10	...	1.2	0.2	...	balance
Alcoa 142	4	...	...	1.5	2	balance
Alcoa 195	4	...	...	...	...	balance
Alcoa 214	...	...	...	3.8	...	balance
Alcoa 220	...	...	...	10	...	balance
Alcoa 355	1.3	5	...	0.5	...	balance
Alcoa 356	...	7	...	0.3	...	balance

Properties (Typical):

	Tensile Strength	Yield Strength	Elongation, Per Cent	Compressive Yield	Shear Strength	Fatigue Strength	Brinell Hardness
Alcoa 43	19,000	9,000	6.0	10,000	14,000	6,500	40
Alcoa 47	26,000	11,000	8.0	11,000	18,000	6,000	50
Alcoa 122-T2	25,000	20,000	1.0	20,000	21,000	9,500	75
Alcoa 122-T61	36,000	30,000	1.0	43,000	29,000	....	100
Alcoa 142-T2	27,000	18,000	1.0	18,000	21,000	6,500	75
Alcoa 142-T61	37,000	32,000	0.5	47,000	32,000	8,000	100
Alcoa 195-T4	31,000	16,000	8.5	16,000	24,000	6,000	65
Alcoa 195-T6	36,000	22,000	5.0	25,000	30,000	6,500	80
Alcoa 214	25,000	12,000	9.0	12,000	20,000	5,500	50
Alcoa 220-T4	45,000	25,000	14.0	26,000	33,000	7,000	75
Alcoa 355-T4	30,000	20,000	4.0	25,000	30,000	....	60
Alcoa 355-T6	35,000	25,000	3.5	29,000	30,000	8,500	80
Alcoa 356-T4	28,000	16,000	6.0	18,000	22,000	....	55
Alcoa 356-T6	32,000	22,000	4.0	22,000	27,000	8,000	70

Commercial Equivalents:

Alcoa	S.A.E.	Eclipsaloy	Army	Navy	Federal
No. 43	35	No. 35	No. 11311	No. 46Ale Cl. 2	QQ-A-601 Cl. 2
No. 47	37	.....	.....	.....	.....
No. 122	34	.....	.....	No. M 212a Cl. 6	QQ-A-601 Cl. 7
No. 142	39	No. 4	No. 57-71-1cA	No. M 212a Cl. 5	QQ-A-601 Cl. 6
No. 195	38	No. 38A	No. 57-72-5B	No. 46Ale Cl. 4	QQ-A-601 Cl. 4
No. 214	320	No. 320	No. 57-72-4A	No. 46Ale Cl. 5	QQ-A-601 Cl. 5
No. 220	324	No. 324	No. 11309-A	No. M-186c	.....
No. 355	322	No. 322A	No. 11307-A	No. M-212a Cl. 10	QQ-A-601 Cl. 10
No. 356	323	No. 323	No. 11308-A	No. 46Ale Cl. 3	QQ-A-601 Cl. 3

NOTE: Data taken from the Aluminum Company of America records. Heat treatment designations: T-2 = Annealing Treatment; T-4 = solution treatment; T-6 = solution treatment plus aging; and T-61 = solution treatment plus aging.

leak-proof castings, castings of thin-walled sections, or for castings for use at elevated temperatures. The alloy is more difficult to cast than the other aluminum base alloys, requiring special sand and handling practice.

Alcoa 355 (Eclipsaloy 322A):

This is one of the best alloys as it has excellent casting qualities and retains its strength well at elevated temperatures up to 400 deg. F. It is leak-proof and pressure tight. It also responds well to heat treatment. It is used for liquid cooled cylinder heads, cylinder blocks in liquid cooled engines, propeller gear boxes, gear housings, superchargers, crankcases, accessory housings, etc. It is also used for cylinder heads in air-cooled engines of intermediate horsepower.

Alcoa 356 (Eclipsaloy 323):

This alloy is used as a substitute for Alcoa 195 when the casting is very complicated. Aging alone will improve the properties, but quenching and aging will produce the maximum properties. It is used for cylinder heads and cylinder block in liquid cooled engines. It is also used for many of the applications referred to under the Alcoa 195 alloy.

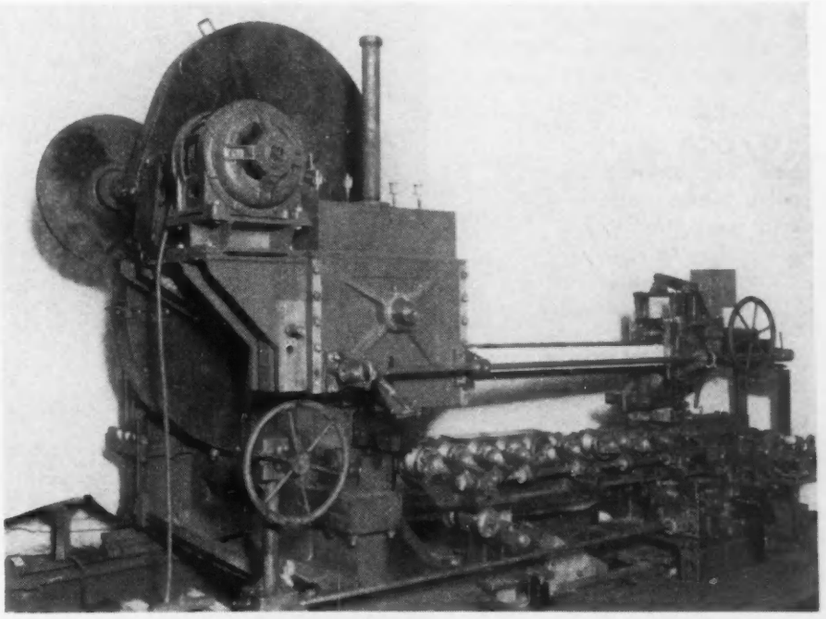
AT LEFT—An Eclipse starter intermediate head sand casting made from Eclipsaloy 38A-STA; (right) an Eclipse starter front housing sand casting made from Eclipsaloy 38A-STA.

Ed. Note:—Next week the author will conclude with data on alloys used for permanent mold, die, and plaster mold castings.

New Type of Billet Shear

BY reason of a diagonal shearing action, less deformation of billet stock is obtained with a new vertical type hot billet shear developed by Lewis Foundry & Machine division of the Blaw-Knox Co., Pittsburgh. The machine is a self-contained accessory which fits into a billet conveyor line. Complete control from a central point permits one-man operation of both shear and runout table, and the operator also retracts the table for discharge of the crop ends. The first unit built accommodates sizes up to and including 4½ in. square, but the design is adaptable to larger sizes.

Power for the shear is provided by a 40-hp. motor, transmitted through a double reduction gear drive which drives a main crankshaft of 7-in. stroke. The shear is actuated by a one-revolution clutch, and by stepping on the foot treadle, the operator places the shear in motion for one cut only. The runout roller table is powered by a 5-hp. motor, which also operates the kick-off fingers when run in the reverse direction. This double action is effected through overrunning clutches. The operations in each cycle are governed by limit switches, which in turn are controlled by the operator's handling of the main and secondary stops on the table gage. The shear gage is moved horizontally by a handwheel to set the length of bars to be sheared. By means of another handwheel, the entire roller table is moved horizontally to provide space for crop end discharge.



THE new Lewis vertical hot billet shear cuts across the diagonal, thereby reducing deformation of the billet stock and avoiding the edge fin common in flat shearing. The knife heads may be seen just to right of the handwheel.

What's the Past,

o o o

By HERBERT CHASE

o o o

LEFT

EXPERIMENTAL set-up showing the addition of synthetic resin to a mass of wood pulp and fibres from the farm, while these are still suspended in water which is kept in motion.

CALL it unthinkable, fantastic, impractical, far-fetched or whatever you prefer, the plastic automobile body appears to be entering the realm of reality. Badly garbled stories have heralded its approach or "actual' arrival for months past. Artists capable of painting pictures based wholly on imagination have gotten publicity by preparing views of what a plastic body might or "should" look like, without worrying about how it could be built. Even the makers of plastics have decried the use and questioned the feasibility of plastics for bodies (aside from ornamental minor parts)—yet the idea of a plastic body persists.

RIGHT

WOOD pulp and strengthening fibers, after treatment with synthetic resin, are sucked from water, in which they are kept suspended by agitation, onto a screen such as that shown shaped to the form of a panel (a rear deck, in this instance), building up on the screen a layer of pulp of sufficient thickness for subsequent molding

Present and Future of Plastic Automobile Bodies?

GREAT interest has been displayed by the steel, automotive and plastic industries in the experimental work and plans for producing plastic automobile bodies which the Ford Motor Co. has been prosecuting. This is believed to be the first accurate and comprehensive account of the development, written by an engineer who is very familiar with plastics technology and also well versed in automotive engineering and in metal working subjects. The article, as here presented, has been checked and released by Robert A. Boyer, who heads the Ford plastic body development work.

o o o

Automotive engineers and body designers, knowing the utility of steel and sceptical about plastics for structural applications, have remained cold about plastics for major body parts. Plastic molders are not too enthusiastic about molding large parts and question the practicability of doing so, even if press equipment, molds of large size and a plastic low enough in cost were readily available. The manufacturer has to discount wishful thinking.

All this is well known and would discourage most ordinary enthusiasts. Yet there may be combinations which will work. Henry Ford evidently purposes to find them, if they can be found. Without any illusions as to the difficulties involved and with an unsurpassed knowledge of sound manufacturing methods, Mr. Ford and his able associates can find an answer if it can be found. At the bottom of his purpose to find out what can be done is a sound and abiding faith that the farmer needs industry and that industry needs the farmer. Mr. Ford has already proved this conclusively in developments based on the soya bean. Plastics figure to some extent, though a minor one, in the soya picture, but for the present, at least, soya plastics are out of the plastic body. Other farm products, notably certain fibers, such as hemp, ramie or the like may figure, as strengthening fillers, but this takes it ahead of the story. Right now, phenol-formaldehyde resin is planned as the basic binder for plastic body parts, and the Ford organization has had long experience with the use of this type of resin, as it enters even into soya plastics, and is used independently of them also for many molded products.

Robert A. Boyer is working in one of the numerous Ford laboratories on the development of a phenolic plastic which, it is hoped, will prove suitable for body panels. Henry Ford follows and directs this work and it has progressed so well to date that molds for an experimental body have been ordered. The body is not to be all plastic, by any means. It is to be built into or around a frame of steel tube, the tube being welded at the joints to form an exceedingly stiff self-supporting structure in which the tubular roof supports and roof members constitute structural parts

o o o

AFTER forming a panel, the vacuum is shut off and the panel, still wet, is separated from the screen. It is then ready to have its water content largely pressed out, after which drying in an oven takes place.

of the truss-like assembly. For very excellent reasons, to be mentioned later, the plastic panels, forming the inclosure, are to be attached to the body frame in such a way that they remain substantially unstressed. Doors are certain to have a frame which is not of plastic and may be of metal, although details remain to be worked out. However, the panels will be of plastic.

Present plans call for a tubular frame weighing about 227 lb. This frame will support the engine and other mechanical parts and provide spring anchorages (somewhat as in Lincoln Zephyrs although the frame is entirely different) and will also carry plastic panels, taking the place of steel panels. Estimates call for about 155 lb. of plastic panels, giving a total weight, including the tubular frame, some 150 to 200 lb. lighter than an equivalent conventional body with its frame. On this basis, about 40 per cent of the body would be plastic and the remainder largely steel. Presumably this does not include interior trim or fittings and it may not include doors or glass.

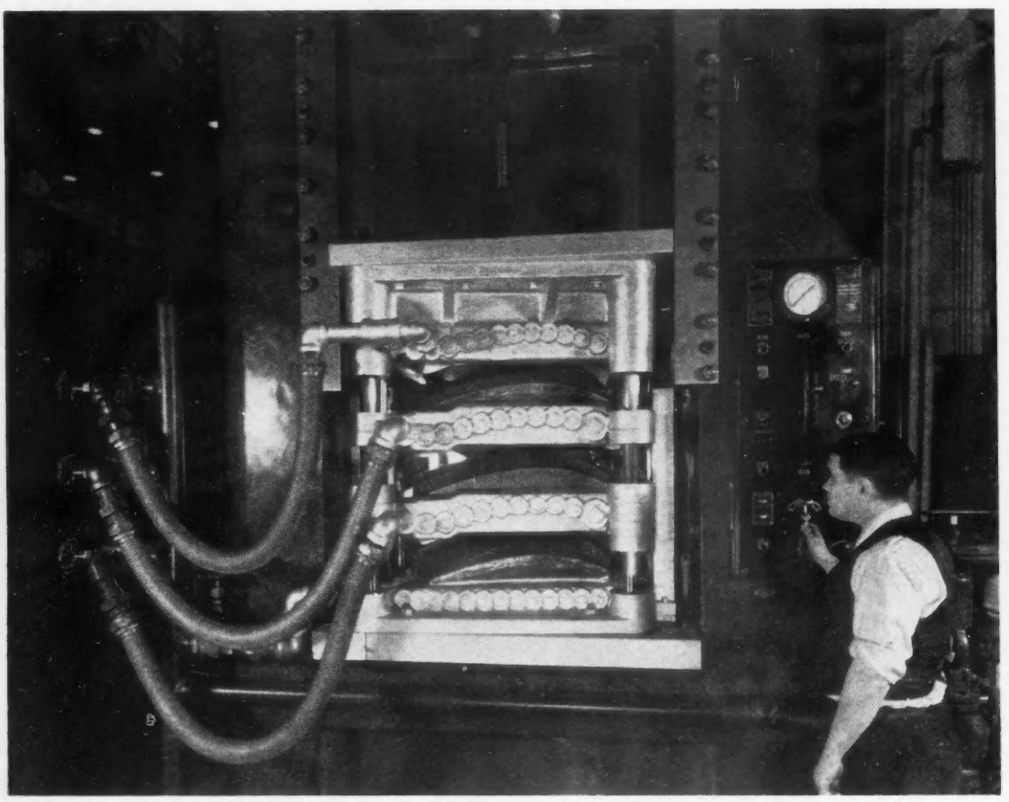
Plastic Panel Much Thicker

Naturally, this whole tentative program is still well back in the development stage. As molds are not yet available, no plastic body shells have yet been built and it is not known how they will perform when they are built. Considerable experience has been gained, however, by molding rear decks for baggage compartments of conventional cars and giving them extensive tests under service conditions. Development work in this direction has been going on for more than two years and experimental decks have, it is reported, given an excellent account of themselves. The plastic panel is molded to shape and is 0.175 in. thick. Partly because of its thickness, which is several times that of the steel panel commonly used, the panel is not easily dented and will withstand blows with an ax which would ruin a steel panel.

Some steel reinforcements have been used at the edges of the deck panel, especially where hardware is attached, and some troubles with loosening of hardware have been experienced. These were occasioned however, by the need for a purely experimental arrangement and temporary adaptation to a steel body structure, using more or less standard parts and a type of fastening known to be inadequate. In production, the fastening parts or studs would be molded in place, anchoring them securely in a way not provided in the experimental molding.

No effort has been or is being made to use the natural color of the molded plastic as the finish for panels. This might possibly be feasible with black, but in colors too many difficulties are foreseen. The combination of steel with plastic necessitates an applied finish on the latter and everything points to simplification if the entire structure is given an applied finish all over, much as for all-steel bodies now in use. No serious difficulties have been encountered, it is understood, with applied finishes over plastic panels and adherence is readily secured. Molded plastic panels have had some surface irregularities which had to be removed, but these were the result of using experimental molds in which the usual highly finished surface was omitted.

That the plastic used in molding



THOUSAND-TON hydraulic press equipped with a three-high set of molds. After preforms, made in the manner described in the text, have been dried, one is placed in each of the three molds and the press is closed. This subjects the plastic preforms to a pressure of about 1600 lb. per sq. in. while the heat, applied in steam channels within the molds, fluxes the resin and causes it to set permanently, thereby molding the preforms into finished panels of correct shape.

panels has satisfactory weathering characteristics is said to have been definitely proved by experience in molding tractor seats from the same material. These seats are understood to have shown no considerable weathering effect when exposed to six months of continuous weathering in Florida and at other points. One such seat was subjected to daily cycles in which it was cooled to 30 deg. below zero F. and afterward placed on a steam radiator at 212 deg. F. or higher. After six months of such tests effects were negligible and the test was abandoned.

Rear deck panels used to date have been molded in a 1000-ton press. As their area is about 1300 sq. in., the unit pressure approximates 1600 lb. per sq. in., which is adequate. Efforts are being made, however, to reduce the unit pressure required, through developments in the plastic itself. It is also proposed to hold the size of panels to a minimum consistent with other conditions so that the total pressure required will not necessitate the use of presses of excessive size.

Present plans call for using in molding a special type of preform prepared in a manner shortly to be described. This preform will be made in a shape such as to fit that of the mold surface and consequently very little flow of the plastic will be needed. This is made necessary by reason of the fibrous nature of the filler used in making the plastic which, in turn, is needed to give the plastic desired strength and relative freedom from brittleness. With such a filler, any extended flow would require excessive pressures and might even then result in moldings with voids or weak sections.

Moldings Relatively Flat

Another consideration favorable to ready molding is to design the panels with minimum draw, that is, so they will be as nearly flat as possible and still provide the required shape. Although this places some limitations on the type of body design which is feasible, if the panels are kept rather small, the total draw can be minimized and still a well rounded body can be secured. By having moldings relatively flat, pressures can be made more nearly uniform over the entire mold surface.

Much experience in molding with the pulp-like preforms used has been gained in production of seats for the Ford farm tractor, made in large quantities. This molding contains reverse curves, requires about 5 lb. of the pulp-like plastic and, when finished, is only some 0.200 in. thick. The molding cycle is 10 min., but, by using a three-high mold (which, of course, produces three seats during one cycle) the time per seat is reduced to one-third that for a single mold. Similarly, the deck door referred to above (which is thinner than the tractor seat) is understood to have been molded in a 6-min. cycle which, with a three high mold figures 2 min. per molded piece. This time might well be increased if inserts for attaching hardware had to be molded in place, as is now contemplated, but still would bring the production rate within reasonable bounds. But, in any event, the use of multiple-height molds would reduce the number of presses required for large production as well as decrease the time per piece.

As yet, the method to be used in fastening plastic panels to the tubular steel frame of the body remains to be worked out, as does the method of making tight and squeak-proof joints between the panels and the frame. It is expected that some metal inserts such as flathead studs for fastening purposes, may have to be applied in each molding. This is not especially difficult and would, presumably, permit of ready replacement of panels damaged in service. Such problems as are involved in mounting panels are thought to be rather easy of solution. Plastics, of course, are better heat and sound insulators than steel and are less subject to resonant effects, all of which is much in their favor and should effect savings in other insulating materials.

It is not anticipated that the use of a plastic shell for the body will, initially, at least, greatly change problems of interior trim, but what effect it may have on window regulators, hardware and other items of construction remains to be seen.

Highly important in the process as a whole is that part relating to the making of plastic preforms in shapes suitable for molding. This may be likened somewhat to making paper from sulphite pulp except that the phenolic resin is added to and absorbed by the pulp while in process of formation. This gives an intimate mixture, presumably impregnating every fiber while the fibers are still in suspension and not coagulated. For increased strength, other fibers, as above mentioned, may be added to the wood fibers forming the bulk of the pulp. It is considered important that the fibers are not oriented but overlap in all directions, for it is this quality which tends to make strength uniform in all directions and thus to form a material which is said to be relatively free from warpage after molding.

To make from the pulp with its reinforcing fibers moldable plastic preforms, the pulp is withdrawn from a beater or tank in which, by agitation, the pulp is kept in suspension in water. From the moving water, the pulp is sucked upward, by partial vacuum, onto a screen having about the same shape as the piece to be molded. When the thickness of pulp on the screen is three to four times that of the piece to be molded, the wet mass is removed, a large part of the water in it is pressed out and the preform is run through a dryer to remove the remaining water. This process yields a preform shaped to fit the mold and containing a sufficient amount of plastic to act as a binder and to give the piece the required strength and rigidity when finally molded.

Clearly, a plant for making preforms alone, on a production scale will involve a large investment and a variety of equipment, comparable in some respects to that of a paper mill. Such a setup, however, would not deter the Ford Motor Co. or any large manufacturer, providing, of course that the end sought is justified by the means required. By keeping to simple shapes which nest readily, handling of the preforms is simplified and the space required is reduced.

As at present visualized, the molding of preforms made in the manner indicated is not very different from other molding of thermosetting plastics except that the molds required and the molded parts themselves are much larger than are commonly used and produced. Large molds require large presses, but even these are not a novelty in Ford plastic molding and rubber plants. A battery of presses large enough to produce Ford body parts on a large scale is something to contemplate, but not beyond the possibilities of a plant comparable to that of the Ford Motor Co. By the use of preforms,

the loading of molds is simplified and the use of molds at least three high in presses has been shown to be feasible. Heating of molds can be done by steam, as in most molding plants, or by electric heaters, as in the present Ford molding plant where plastic moldings of smaller size for cars in current production are now produced in large quantities.

Molded Panels Are Tough

Molded panels made in the manner indicated are exceedingly tough and appear to have ample strength for use as body panels, especially when mounted in a tubular steel structure, as contemplated, and attached to this structure, as planned, in such a way that the panels are not subjected to weaving and other stresses. Moldings of this type are not to be likened to ordinary plastic moldings made from resins and wood flour and which, of course, are relatively brittle. The Ford molding is more like a laminated plastic having a paper of fibrous filler, but without having the fibers oriented. Unoriented fibers, besides making for freedom from warpage, tend to make strength uniform in all directions. By working with a pulp-like mass to make preforms in the manner indicated, the material is distributed as required in the mold and the pressure needed in molding can be moderate, especially as compared with the use of a molding material containing macerated fabric which is expensive and very difficult to mold, requiring extreme pressures.

Clearly, the Ford program for making a body with a plastic shell has been well thought out and has neatly solved or side stepped certain problems heretofore considered well nigh insuperable. That many problems still remain to be solved is as keenly appreciated by those working on the development as it will be by others who stand on the side lines and comment. Developments of this type do not occur over night. They require years of patient development work, always with the possibility that, in the end, the product may not meet expectations or may cost more than established products produced by conventional means.

When it comes to relative costs of a body made entirely of steel by current production methods and one with a tubular frame and plastic shell, there are too many variables and too many unknown factors involved to do more than guess. Few men have keener appreciation or wider knowledge of what may be involved than Henry Ford. He, clearly, has faith in what may be accomplished, but it may be doubted if even he knows what relative costs will be until the development has gone farther than at present. There is little doubt that a plastic body of the type in question *can* be built and can be made to serve its purpose, but what this may involve remains to be seen.

Although transition from the present all-steel body to one of the type above described would work something of a revolution in body manufacture (should it come to pass), such a change might be little greater than that the industry experienced in going from wood-frame, steel-shell bodies to the all-steel type. A plastic body of the type described would, of course, greatly reduce the use of steel sheet. It would substitute much steel tubing for flanged steel parts. It would necessitate many changes in manufacturing equipment. Many stamping presses, for example, would give place to plastic molding presses. If the transition comes, it will be gradual, of course, much as in similar transitions in the past.

Among the many questions which arise, that of the availability of materials is not the least. Evidently Mr. Ford expects some of them to come from farm and forest. At present the supply of phenol for making resin for plastics is quite limited and does not come from farm or forest. Only a few pounds, at most, are used in current plastic molded parts of today's cars. To multiply the supply many fold would be a huge task but not, perhaps, beyond reasonable possibilities. Other and cheaper plastics also constitute a possibility long discussed and not to be overlooked. When new demands arise, American industry usually finds a way to fill them, even though it may require years of research and development to do so.

Newport Announces Colorbond, For Paint, Etc.

THE Newport Rolling Mill Co., Newport, Ky., announces the addition of Colorbond to its list of products. This galvanized sheet is subjected to chemical and metallurgical processes that change the surface finish without weakening the protective spelter coating. Instead the galvanizing remains unimpaired—a durable protection that safeguards the metal even after the paint coating has disappeared.

Paint, enamel, varnish, lacquer and other finishes may be used on Colorbond with complete satisfaction. The producer states that numerous tests were employed—abrasion, corrosive liquids, exposure to the elements, excessive heat and severe cold, humidity, submersion, and many others—to demonstrate the advantages of Colorbond processing. It is said that the spelter coating will not kill the essential oils in the paint and cause it to lose elasticity and durability; and no longer need cracking, peeling or flaking paint on galvanized work give an unsightly appearance to a building.

It is stated that Colorbond can be easily fabricated and formed without special tools. It is made in three base metals: Gohi pure iron-copper alloy; KCB copper steel, and Globe band steel. It is available in all sizes and gages.

41 Lessons in ARC WELDING

—Continuation of a series of lessons to enable beginners to master the fundamentals of bare and shielded-arc welding techniques.

LESSON No. 4: *Object is to study the art of weaving the electrode.*

Apparatus used is Flex Arc welding machine, chisel, hammer and wire scratch brush. Material used is steel plate 3/8 in. or heavier, and 5/32-in. diameter Flex Arc welding electrodes.

INSTRUCTIONS: When depositing metal it is often desirable to make the width of the deposit wider than is obtained by a string bead. In such cases a weaving motion is applied to the electrode as it is advanced along the line of weld.

There are a number of different weaving motions used in welding but in all cases it is important that this motion be uniform. Typical weaving motions are illustrated in Fig. 9. For bare type electrodes the weave shown in Fig. 9a will generally be found the most satisfactory.

If the weave used is not uniform or close enough there is danger of obtaining poor fusion at the edges of the deposit. Examples of poor weaving procedures are illustrated in Fig. 10.

PROCEDURE: Set the polarity reversing switch on straight polarity, adjust the machine to 150 amp., and place the plate flat on the welding table.

(1) Deposit a bead 1/2 in. wide from left to right by using the weaving procedure shown in Fig. 9a. Examine the appearance of the bead and repeat until a deposit of uniform appearance and width can be obtained.

(2) Deposit a bead 1/2 in. wide from right to left using the procedure shown in Fig. 9a. Examine the deposit and note the difference between that obtained by the previous weave.

(3) Deposit a bead 3/4 in. wide working away from the operator. Examine the bead for uniformity and repeat until satisfactory results are obtained.

(4) Repeat (3) by working toward the operator.

(5) After exercises (1) to (4) inclusive have been mastered make a test plate as shown in Fig. 11.

LESSON No. 5: *Object is to deposit beads of weld metal on a surface inclined at 45 deg. with the horizontal.*

Apparatus used is Flex Arc welding machine, chisel, hammer and wire scratch brush. Material used is steel plate 1/4 in. thick and 5/32-in. diameter Flex Arc welding electrodes.

INSTRUCTIONS: When depositing weld metal in the horizontal position there is no tendency for it to run more to one side than to the other. When welding on an inclined surface this condition is not the case because the force of gravity tends to cause the molten metal to run downward. As a result special care must be taken in such cases to produce a uniform bead that does not have excessive roll or overlap as shown in Fig. 12.

In order to produce the proper bead a short arc should be used and the welding current should be varied to suit the direction of welding Depositing a horizontal bead requires about the same current as a similar bead deposited on a flat plate. Welding upward requires slightly less current while welding downward requires slightly more current. The angle at which the electrode is held is also important.

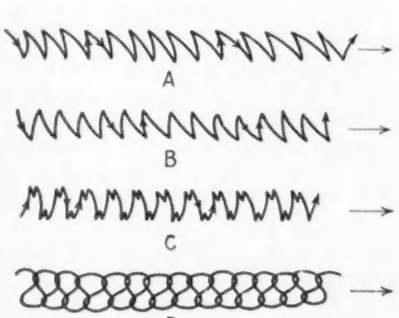
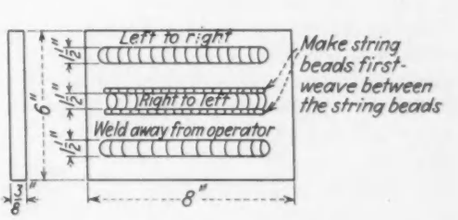
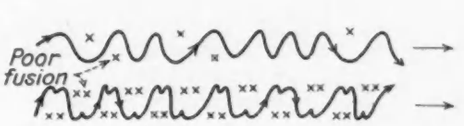


FIG. 9—These types of weaving motions are frequently used.

(AT RIGHT)

FIG. 11 — After weaving techniques have been studied, this type of test plate should be prepared.





(AT LEFT)

FIG. 10 — These are examples of poor weaving procedures.

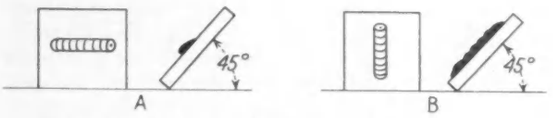


FIG. 12—When welding on an inclined surface special care must be taken to produce a uniform bead that does not have excessive roll or overlap.

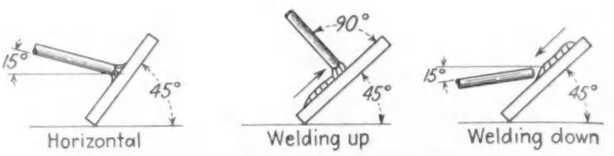


FIG. 13—Recommended positions for holding the electrode. Welding down position is for thin material only.

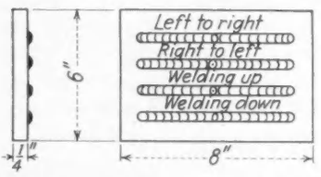


FIG. 14—After reasonable skill is obtained by welding in all directions, this type of test plate should be prepared. Start and stop each weld at the center.

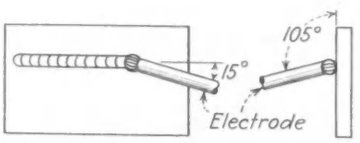


FIG. 15—This electrode position is recommended in welding a horizontal bead on a vertical plate.

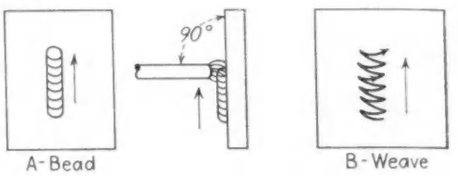


FIG. 16—Weaving is accomplished in this manner.

The recommended positions are shown in Fig. 13.

Striking the arc to continue a bead is done in the manner outlined in Lesson No. 3.

PROCEDURE: Set the polarity reversing switch on straight polarity and adjust the current to 150 amp. Support the plate to be welded at an angle of 45 deg. and make sure it is securely grounded.

(1) Practice depositing horizontal beads working from left to right. Stop and continue some of the beads as discussed in Lesson No. 3. Inspect the beads for uniformity, roll, overlap, and undercut.

(2) Practice depositing horizontal beads working from right to left. Inspect the beads for uniformity, roll, overlap and undercut.

(3) Practice depositing beads by welding from the bottom up. Try different rates of advance and note the effect upon the shape of the bead. If it is found impossible to prevent excessive roll reduce the current slightly.

(4) Practice depositing beads by welding from the top down. Try different welding speeds and currents until the most satisfactory results are obtained. Stop and clean some of the beads and inspect for fusion.

(5) After reasonable skill is obtained by welding in all directions make a test plate as shown in Fig. 14.

LESSON No. 6: *Object is to study the method of depositing beads on a vertical surface.*

Apparatus used is Flex Arc welding machine, chisel, hammer and wire scratch brush. Material used is a steel plate ¼ in. or thicker and 5/32-in. diameter Flex Arc electrodes.

INSTRUCTIONS: The deposition of weld metal on a vertical surface is more difficult than the deposition of weld metal on a horizontal surface because of the tendency of the molten metal to run as a result of the force of gravity. A very short arc is required in all cases and the proper position of the electrode is essential. Weaving may be done when welding upward or downward but it is not recommended when welding horizontally along a vertical plate.

When depositing a horizontal bead on a vertical plate, the electrode should be pointed upward and backward toward the deposit at angles of about 15 deg., as shown in Fig. 15. A short arc is required and the welding current should be about the same as that required for downhand welding.

When welding uphill the electrode should be held approximately at right angles to the plate surface. A welding current slightly lower than that used for downhand welding is recommended. Weaving may be accomplished by passing the electrode across the plate surface and giving it a slight upward motion at the ends of the weave, as shown in Fig. 16. When weaving the welding current should be slightly lower than when depositing a string bead.

When welding downhill the electrode should be pointed upward at an angle of about 15 deg. A short arc is required and the welding current should be slightly higher than is the case when welding uphill. Weaving can be accomplished when welding downhill, care being taken to prevent the metal from running ahead of the arc. A simple back and forth motion is satisfactory for the weave.

PROCEDURE: Set the polarity reversing switch on straight polarity,

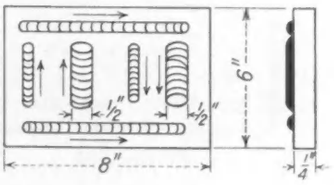
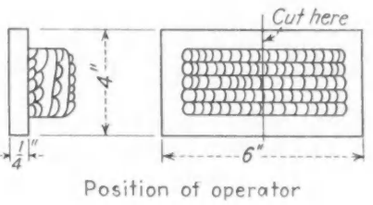


FIG. 17—Test plate for depositing beads on a vertical surface.

FIG. 18—Different methods of depositing string beads for subsequent study. Do not change position of plate during welding.



adjust the welding current to about 150 amp. and tack weld a ¼-in. plate in the vertical position.

(1) Deposit a horizontal bead by welding from left to right. If the welding current is not correct adjust it for better results. Repeat the deposition of beads until they are uniform in appearance and free from undercut and roll.

(2) Repeat exercise (1) by welding from right to left.

(3) Deposit a bead by welding uphill. Practice stopping and continuing the bead.

(4) Make a deposit by welding uphill and weaving to make the weld about ½ in. wide.

(5) Deposit a weld by welding downhill. Adjust the welding current and speed of travel so that a uniform bead can be made.

(6) Weld downhill by weaving so as to make the deposit about ½ in. wide.

(7) After the above exercises are completed, make a test plate as shown in Fig. 17.

LESSON No. 7: *Object is to study the deposition of a pad of weld metal on a steel plate.*

Apparatus used is Flex Arc welding machine, chisel, hammer and wire scratch brush. Material used is steel plate ⅜ in. thick, 6 in. long and 3 in. wide, and 5/32 in. diameter electrodes.

INSTRUCTIONS: It is often desirable to build up a surface by depositing a pad of weld metal on the same. In such cases it is essential that the weld metal be sound and that good fusion be obtained between each deposit. The procedure that will be used in depositing the pad is not necessarily the one recommended for such work. It is developed primarily to test the student's ability to deposit a sound pad by using the knowledge already obtained in weaving and depositing string beads.

PROCEDURE: Set the polarity reversing switch on straight polarity, adjust the current to 150 amp. and place the plate to be welded flat on the welding table. Deposit a pad of weld metal 4 in. long and 2 in. wide on the plate as in the following manner.

(1) Deposit the first layer in string beads, working from left to right. (See Fig. 18.)

(2) Deposit the second layer in passes ½ in. wide by weaving, working from right to left. (See Fig. 18.)

(3) Deposit the third layer in string beads welding toward the operator. (See Fig. 18.)

(4) Deposit the fourth layer in passes ½ in. wide by welding from right to left. (See Fig. 18.)

(5) Deposit the fifth layer in string beads welding away from the operator. (See Fig. 18.)

(6) Deposit the sixth layer in string beads welding from right to left.

(7) After the pad is finished, saw it in two, polish the cut surface and etch with a solution of nitric acid. The pad should show sound weld metal, complete fusion and the entire absence of slag inclusion.

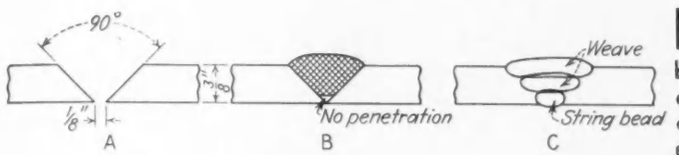


FIG. 19—If plates are butted together, some difficulty may be experienced in obtaining complete fusion and penetration.

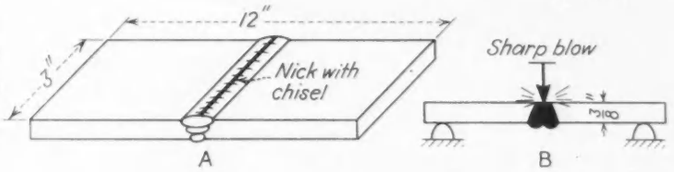


FIG. 20—Weld may be fractured in this manner and examination made for fusion, gas pockets, etc.

LESSON No. 8: *Object being to weld together two ⅜-in. plates using a single vee butt joint.*

Apparatus used is Flex Arc welding machine, chisel, hammer and wire scratch brush. Material used is two ⅜-in. thick plates, 3 in. wide and 6 in. long with a 45 deg. bevel along one end of each plate, and 5/32-in. diameter Flex Arc welding electrodes.

INSTRUCTIONS: A butt weld is used to join together two plates that have their surfaces in the same plate. A number of different joint designs can be used, but this lesson deals with a single vee joint having an included angle of 90 deg., as shown in Fig. 19a. The root of the joint should be spaced about ⅛ in., as shown, to aid the operator in obtaining complete penetration. If the plates are butted together, some difficulty may be experienced in obtaining complete fusion and penetration, as shown in Fig. 19b.

Three layers should be used to fill and reinforce a single vee butt weld between ⅜-in. plates. The first layer should be made with a string bead. The other layers should be made by weaving the width of the joint. See Fig. 19c. Special care must be taken to obtain complete fusion between layers and at the kerf surfaces of the plates.

PROCEDURE: Set the polarity reversing switch on straight polarity, adjust the welding current to 150 amp. and clamp the plates to be welded flat on the welding table, being sure to space the joint ⅛ in., as shown in Fig. 19a. If clamps are not available, tack weld the plates together at each end of the joint.

Weld the plates together by using three passes, as previously discussed. Carefully clean all spatter, scale and oxide from each layer before the next layer is deposited. Be careful to obtain complete fusion at all times. Inspect each pass for uniformity of appearance and try to improve the appearance as the weld progresses.

After the joint is completed, have the instructor inspect it for appearance. Following the instructor's inspection, make a nicked groove down the center of the top layer and break the specimen as shown in Fig. 20. The exposed fracture should show sound uniform weld metal entirely free from gas pockets, slag inclusions and poor fusion.

Repeat the exercise until a satisfactory butt weld of this design can be made.

Ed. Note:—These lessons will be continued next week.

Materia

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SINCE something more accurate and more concise than names or words is necessary, once the materials are classified and designated, they should then be symbolized.

CLASSIFICATION: The first task is the inventory analysis and the development of a standard classification of materials to promote their ease of control and to facilitate material simplification. Complete inventory information must be available before any decision can be made as to the possibility of eliminating any items or extending their use by specifying them for additional purposes.

In order to arrange the materials in classes or groups, all grades, forms, and sizes of materials of any importance carried regularly in stores or purchased regularly from the mill or local warehouses are listed. This is accomplished by checking the perpetual inventory cards and the files of past purchase orders. With respect to manufacturing materials, the classification is usually worked out on the basis of the kind of material.

The requirements of daily operating conditions also demand the application of a standard nomenclature to the items that have been arranged through the development of a classification. The descriptive name or appellation assigned is often termed the "designation."

SYMBOLIZATION: Since something more accurate and more concise than names or words is necessary, once the materials are classified and designated, they should then be symbolized. Symbolization is the assignment to all classified items, of a limited number of related characters, which may consist of figures, letters or signs, in such a manner as to aid in the recognition of the item. The purpose of symbols is (a) to fix definitely its identity separately from all other items, and (b) to obtain brevity in writing orders, reports and other documents.

The materials division is chiefly interested in the symbols for materials, but any symbol system which is to be fully usable should be tied in with the accounting and production symbol systems. Therefore, the symbols should represent names and descriptions of accounts as well as of materials.

The two general types of symbol systems most usual in industry are the numerical and mnemonic, and though the former is by far the more common, the latter is the more scientific. In the numerical system, a series of numbers is applied to the items. An attempt is sometimes made to indicate the various classes of items by breaking the series into groups. The disadvantage of such a system is that there is nothing in the symbol itself to identify the item, unless the arbitrary divisions of numbers that have been established can be remembered. A mnemonic symbol is one in which the symbols are combinations of numbers and letters so constructed as to suggest the identity of the items they represent. The first number or letter of the symbol designates the general class to which the item symbolized belongs, and successive numbers or letters indicate subclasses and subsubclasses of this general class.

SIMPLIFICATION: Following the classification and symbolization of the inventory, and while establishing standards, it is essential to effect simplification. Simplification or standardization of variety may be defined as the act of reducing the types, grades, forms or sizes of materials employed to the fewest significant number consistent with successful operation. Although certain applications might be covered better with a special grade of material, such a special grade is removed from the classified list when

Standardization

By FRANCIS G. JENKINS
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—Last week the author developed the outlines of the nature of material standardization, and sketched the organization necessary. Herein, in conclusion, information is given on the procedure for development, i. e., inventory analysis, research, committee conferences, enforcement, etc.

the standard grade is satisfactory. The scope of material simplification also comprises the establishment of correlated interrelations such as preferred dimensions, seriation of grades, dimensions and tolerances as well as chemical, physical, and other serviceability factors. Scientific managements have found it essential to set up such limitations and seriations to which their designers and requisitioners must adhere.

The basic determinants in the selection of the standard material from the point of view of simplification are (a) the material's relative demand within the enterprise, (b) its commercial availability, and coverage by standard specifications such as the ASTM and ASA, and (c) the ability of the material to serve for as many different purposes as possible. Thus simplification is a function which seeks to conduct all material supply activities in the least elaborate manner, and yet at the same time to assure establishment of a list of standard materials which will meet practically any requirement.

Research

After suitably classifying and symbolizing the materials, the first step, if this has not already been taken, is the establishment of a material standard. Common knowledge does not cover sufficient ground for a standard or specification based on it to give the material that is needed. Therefore, materials are adopted as standard only after an extensive study of all related conditions. These standards are based on the findings of experiment, practice, and service, and the properties, numerical values and tolerances, both chemical and physical, in all purchase specifications cannot in general be stated without preliminary research. Furthermore, research is often entailed in the balancing of a number of the complex, constantly changing factors, affecting the revision of the standards and specifications.

The determination of a standard material and the subsequent preparation of a preliminary specification involves the accumulation of information from the following available sources:

PAST EXPERIENCE: Consulting the experience of the engineering, metallurgical, inspection, and using departments as to the behavior and characteristics of good and bad materials in manufacture, as well as the experience of those who are familiar with good and bad materials which have given service, is the best source of information. Upon the point of consultation with those who must use the material, it is wise to make the consultation as broad as possible. Comparisons of views and comparisons of experience from the different foremen throw much light on the subject. Moreover when the specifications are finally issued, they will be more readily received than if the specifications were prepared without their having any voice in the matter.

Another source is a careful examination and investigation of material that fails in service. Valuable information may be gathered from this source, and indeed the examination of material that gives short life or that fails, or otherwise does not work satisfactorily, is very often the starting point of the specification.

However, it is not safe to rely entirely on information from such sources unless it is so clear as to be beyond question. The reason for this is that it is hardly ever possible to obtain results of experiences with good and bad material in manufacture or service which will not present some contradictory results, either because they have not been subjected to the same conditions or because of the defectiveness of records.

DIRECT EXPERIMENT: It is often possible to obtain more satisfactory data with less time, trouble, and expense by making positive experiments under controllable conditions. If the materials in question are of such a nature that a direct comparative test of their important qualities can be made by subjecting them to the same conditions, it is always preferable to

use this method of securing information, rather than to take material which has been in service.

In this regard examination should be made of the materials that the market affords. Manufacturers of the type of material in question are requested to send a sufficient sample of such material as they can furnish, and furnish regularly and satisfactorily. These samples are then examined and tested in the light of the proposed or effective specification. This latter source of information is also not always wholly reliable, since manufacturers are inclined to put their best foot forward and consequently send for examination a little better material than they can make regularly.

MANUFACTURER: When necessary, data should be obtained from the manufacturers, or they should actually be paid a visit, to learn what successfully marketed materials are available, what they will give, and their cost. A more or less intimate knowledge of the methods used in producing the manufacturing material is deemed essential. It not infrequently happens that by an inspection of the materials used in manufacture and the processes used, and by consultation with those who make the materials, valuable information is procured that enables the specification writer to avoid putting into the specification requirements which are unwise. The more intimate the knowledge of the standards engineer concerning the processes by which the material is made, the more wisely the specifications will be drawn.

TECHNICAL LITERATURE: A search of available technical and trade literature should be made. A standard or specification, above all, should embody the results of the latest and best studies of the properties of the material which it covers.

NATIONAL STANDARDS: The advantages to be gained by the use of specifications are realized to the greatest extent when the specification is standard throughout the country. Therefore, to assist in drafting metal standards and in the writing of metal specifications, up-to-date files of the following technical society and government standards should be maintained and consulted:

American Society for Testing Materials
Federal Specifications Board
American Standards Association
United States Navy Department
Society of Automotive Engineers

Committee Conferences

It has been pointed out that material standardization is not confined to a single department, but is a matter of conference action with several departments concerned. A primary function of material standardization is the arrangement of such committee conferences. This is done when warranted by the number and importance of the standards data, specifications and questions to be discussed and the differences to be reconciled. It is the practice of some companies to adopt a regular date and to hold these conferences frequently. The material standards department representative, with the consent of the committee chairman, calls the meetings, notifies the appointed committee members, and invites any others who, in their judgment, are interested in the materials to be discussed. Any member of the committee should ask assistants, that may be deemed necessary, to attend the meeting with him.

To such conferences, carefully prepared recommendations for discussion and approval are brought by the material standards department. These subjects are announced in advance so that those participating may come prepared with questions and information. Sub-committees may be appointed to develop technical and other information for the use of the committee. The minutes show the action taken in sufficient detail that the recommendations may be intelligently complied with throughout the departments concerned. These minutes are furnished not only to each member of the committee and all those present at the conference, but to others interested as well.

Approval

VENDOR: The information having been drawn up, it is put in print in proof form. A good specification is the result of the joint efforts of those who know the material from its behavior both while in process of manufacture and while in fabrication and service. Assuming that the manufacturers desire to furnish what the consumer wants, the specification is really in the nature of an agreement between the manufacturer and the consumer. Consequently, it is important that a new or revised specification be submitted to several present or prospective suppliers for comments and approval before it is issued.

Any criticisms from the manufacturers having been received, they are sifted and, if advisable, are introduced in the original draft of the specification. It is the case with some materials, however, that those who are to furnish the materials have different ideas as to what is the most desirable material, and also have different facilities, resulting in different costs of manufacture. It is therefore not possible to follow all the suggestions of the manufacturers, and more often than not the criticisms of the manufacturers may be a good antidote to each other. Where they all agree upon a point, it is usually wise to follow their suggestions. Where there is a difference of opinion the standards engineer is probably safe in following his own judgment.

CONSUMER: Upon approval by the manufacturers the specification in proof form is submitted to a general conference of the company's standards committee for adjustment and verbal endorsement prior to circulation as recommended standards. This general conference, depending on circumstances, may be preceded by a preliminary conference of the proponent group for discussion. The specification should be concurred in by the most competent company experts and by all parties whose interests are affected, so that their consensus, as crystallized therein, can be expected to control production.

The comments from these various sources are considered, the preliminary draft is modified if necessary, and the specification is submitted for final approval to members in each plant of the materials committee. Verbal approval at the general conference is considered insufficient authorization for publication, and consequently signed acceptances are required.

The new or periodically revised standards catalog data are submitted to the material standards committee for approval in a manner similar to the purchase specifications.

Thus the final decision as to the specification or standards catalog data is a matter of compromise among all the above agencies in the best interests of the company. It should be stressed that standardization work must be undertaken

with a definite desire to arrive at a solution, and with the willingness to sacrifice part of one's own interest to the problem under consideration.

In the preparation of the catalog engineering data, the first step is to classify all items under appropriate headings. A definite policy of classifying by material or form should be adopted. The catalog section should be carefully planned, arranged and compiled to be of maximum service. The most convenient books are those divided into sections with tabbed index sheets between them. If carelessly prepared, its ineffectiveness will immediately be apparent; in consequence, it will rarely be consulted and never depended upon, and the time and money spent on its preparation will be wasted.

Upon the issuance of purchase specifications, the index of material specifications is corrected by the material standards department, and an engineering data section is prepared covering briefly such general information about the material as will be of real benefit to the user. The maintenance and revision of the ordering, cost, and stock data should be an automatic and periodic function, also, of the company's material standards department.

Distribution

After final approval, the specification is typed for printing, stencils cut, mimeographed on 8½x11-in. sheets, and the necessary copies distributed for insertion in loose leaf books which can change with the system. Purchase specifications should be issued to vendors from whom the company purchases the materials concerned. Within the company, the specifications should be issued to the purchasing department, inspection department, and to those others responsible for the use of the materials which they cover.

Standards catalog data, including engineering data and ordering, cost, and stock data, should be placed in the hands of all persons responsible for the requisitioning of materials and its design and utilization, with instructions to use existing standard materials so far as possible.

Enforcement

Upon approval of the specification by the vendor, the purchaser is fully justified in expecting that, on all orders to the vendor, the materials furnished will conform to the specifications. As previously stated, if the material does not meet the specification it is the duty of the inspection and purchasing departments to enforce the specification by rejecting the material. The efficiency of the specifications and the certainty of obtaining good material depend on this enforcement, and the more rigid the rejection the better the shipments. Otherwise, if some peculiarities of the specifications are ignored and material accepted which does not quite fill the requirements, the manufacturers soon learn to take advantage of this and every shipment that is received has this peculiarity.

Revision

The implication of material standardization is not that perfection has been reached, but that the standard is merely the most rational or accurate that can be set up under the conditions which exist at any given time, or may have existed over any period of time. Once materials are standardized, they should be under continuous critical surveillance, and constant attempts should be made to raise them toward perfection. Each suggestion from the vendor, metallurgical, engineering, purchasing, inspection and using departments should be carefully weighed. At all times, suggestions from employees concerning the material standards should be encouraged and utilized.

Owing to the lack of knowledge of the properties of many materials when they are first used, and also to the undeveloped state of the art as regards methods of test, a considerable proportion of new material specifications is incomplete in some respects. A new specification will be fortunate if it does not require revision in from six months to a year after it is issued. Material standards and purchase specifications should be discarded or modified promptly, when the need for a material passes, to accommodate changes in design, processing, or service requirements, or when it is economical to change in order to take advantage of improvement in the quality of materials or of the introduction of new materials. Because there is a distinct disadvantage in allowing specifications and standards to become so set that their revision becomes a difficult and time consuming process, many managements have recognized also the advisability of instituting a periodic check of their specifications.

The success of standardization depends upon the degree of flexibility of standards that is maintained, which involves a working arrangement so set up as to facilitate revision, and the full utilization of this arrangement by making revisions whenever this can advantageously be done. However, when specifications have been set up no change in them should be permitted unless approved by the material standards committee. Thus, while there is nothing in the idea of standardization that precludes change, nevertheless standardization protects from changes which are not in the direction of improvement.

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Corronized Wire Cloth

UP at Hanover, Pa., located in York County where a large portion of the nation's wire cloth or fly screen is produced, the Hanover Wire Cloth Co. is rapidly turning out substantial tonnages of Corronized wire cloth for domestic consumption.

The company, which at present is supplying its entire output of Corronized fly screen to Sears Roebuck & Co., holds a license from Standard Steel Spring Co., Coraopolis, Pa., which originated the process. Non-technically, Corronizing is a combination of nickel and zinc plating, followed by a special heat treatment which produces a corrosion resisting layer.

The Hanover Wire Cloth Co., following a few months experimentation in establishing proper operation of equipment, began to make Corronized wire cloth commercially late last year.

At the present time a single unit is producing fly screen 24 hr. a day. According to Hanover officials, the Corronizing of wire cloth is the first major innovation in this industry in a number of years.

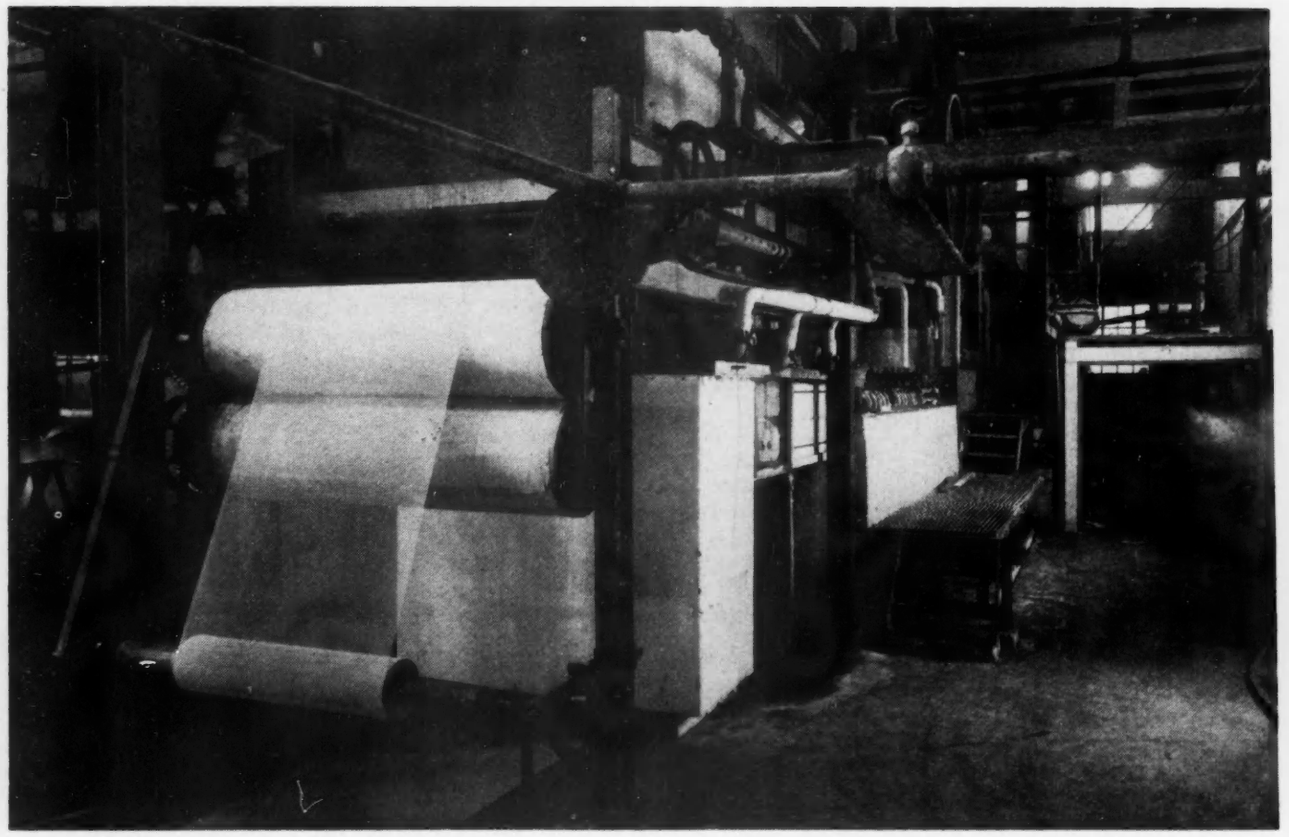
A chronological and brief description of the production of Corronized wire cloth follows:

The woven wire cloth is cleaned in the usual way preparatory to electroplating. The first plating cycle begins with the electro-deposition of a very minute amount of nickel. Usual nickel plating practice is followed. Following the nickel plating the cloth is rinsed and passes into the zinc plating tank. The zinc thickness is slightly greater than the nickel thickness. Total thickness of nickel and zinc is approximately 0.0002 in.

Following the zinc plating, the wire cloth is rinsed and travels to a 40-ft. steam drying tower. The material which has the usual electroplated zinc appearance, is rolled into coils which are periodically disengaged and moved to the heat treating furnace. Plans are now under way to eliminate this operation and make the process completely automatic.

The final product has a dark slate color and the coils are then sent to

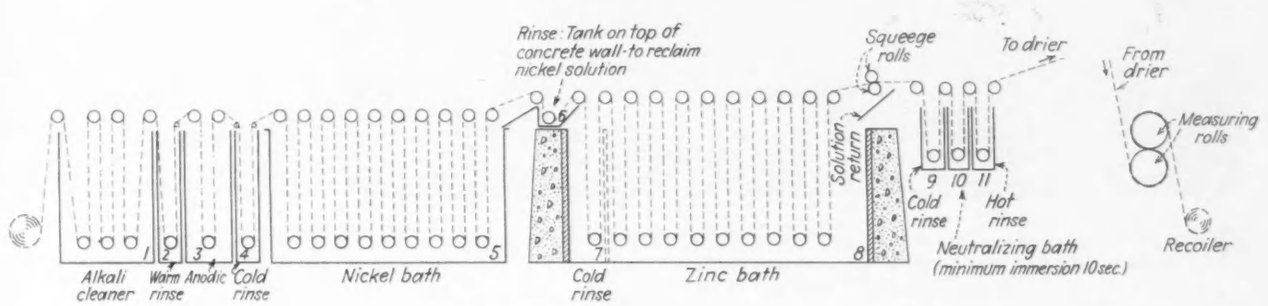
FINISHING end of the Corronizing line. In the immediate foreground is the take-up reel, while the two rolls above it are the tension reels which pull the screen through the various tanks. The tank alongside the low grating platform is the zinc tank and the tank immediately beyond this is the nickel tank. The heat exchanger and filter for the nickel are on the balcony at the right.



—An innovation in fly screen manufacture

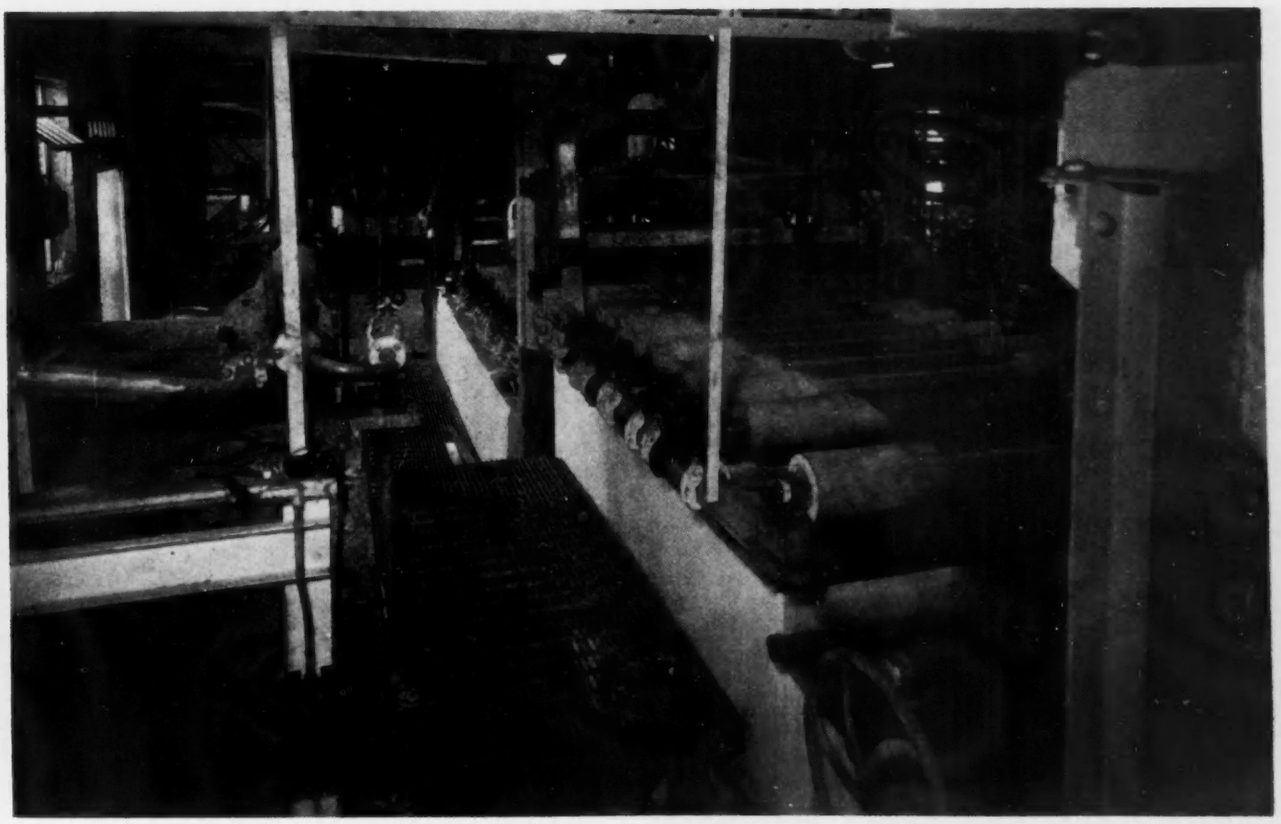
By T. C. CAMPBELL

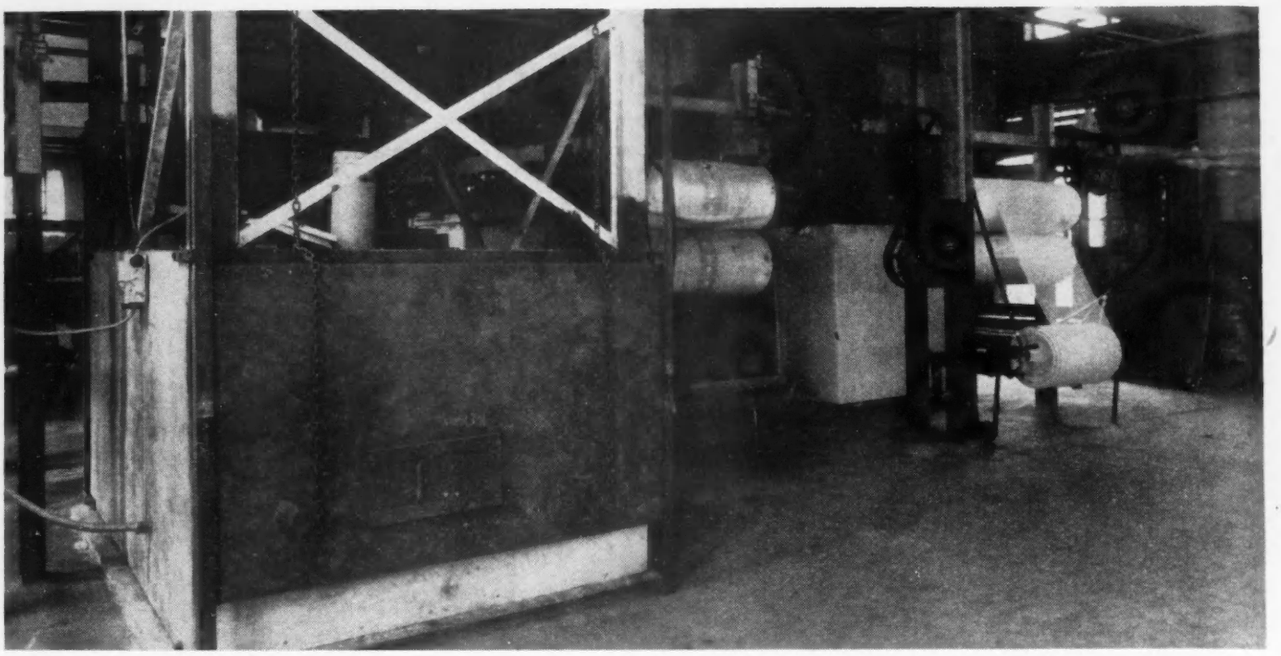
Pittsburgh Editor, The Iron Age



SCHEMATIC drawing which shows the set-up for the Corro ıizing installation at the plant of the Hanover Wire Cloth Co.

STARTING end looking toward the discharge end. At th e extreme right is the filter press for filtering the nickel solution, and on the same platform is the heat exchanger w hich heats the nickel solution. The tank at the left is the nickel plating tank, while the tank immediately in front of it is the zinc plating tank.





THIS oven is used in performing the Corronizing treatment, while at the right is the discharge end of the plating line.

the paint department. Here the screen is enameled with a distinctive gray enamel having a slight blue tint, inspected, and coiled in 100 ft. lengths.

Interesting, and possibly the real reason why York County produces so much wire cloth, is because the original loom maker started business about 14 miles from Hanover at Glenrock, Pa. These looms were subsequently utilized in the making of wire cloth and several companies sprang up years ago in and around York, Pa.

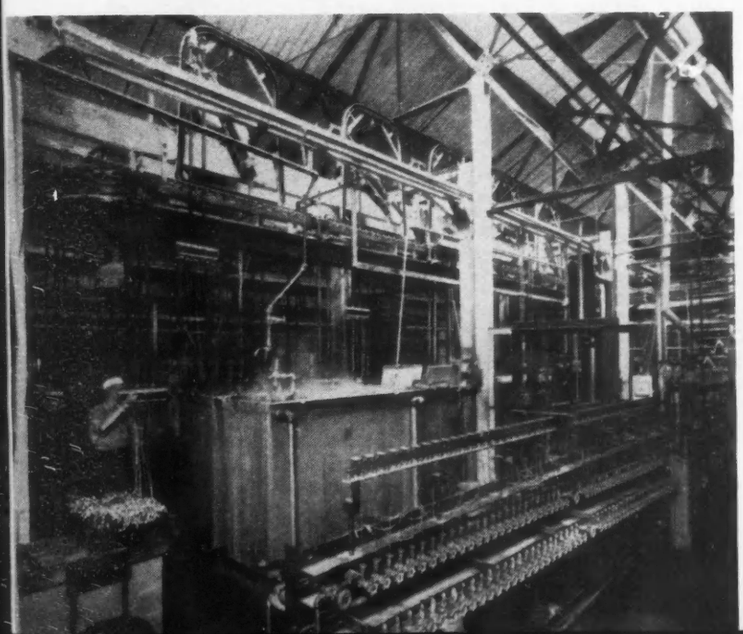
Thermostat Elements Also Being Corronized

THE Robertshaw Thermostat Co., Youngwood, Pa., producer of precision thermostatic control units, is now in production of Corronized thermostat elements. The coating, predominantly a thin nonporous nickel plate, protects the bulb end which is exposed in the corrosive oven atmosphere.

The actual thermostat is comprised of two different sized sections of copper tubing filled with a temperature-sensitive medium which expands and contracts a small diaphragm attached by high heat resistant solder to one end of the tube. The large tube is swedged to fit the smaller one and acts as the bulb which is inserted into the oven. One end of the tube is left open for the activating medium which is forced into it by the alternate use of vacuum and pressure, and finally sealed.

A series of checks and calibrations is again made and the units are then loaded on the automatic Corronizing plant conveyor which completes the processing cycle in approximately 40 min. The thermostat is then removed from the conveyor and sent to the assembly lines where it is attached to valves and controller bodies which will maintain within a fraction of a degree the temperature of any heating unit.

The equipment for the Corronizing plant, which operates at the rate of over 1,000,000 parts per year, was made and installed by the Hanson-Van Winkle-Munning Co., Matawan, N. J.



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SHOWS the thermostats being placed on the conveying mechanism preparatory to entering the cleaning tank. One conveyor carrying the thermostats is shown entering the cleaner tank and the man is shown charging the next conveyor.

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New Techniques Reviewed by A.I.M.E.

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Testing of Stainless Steel, Controls for Bessemer Process, Examination of Open Hearth Slags, etc., Feature Iron and Steel Sessions.

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MORE than 2500 of the 15,000 members of the American Institute of Mining and Metallurgical Engineers registered in the Engineers Building, New York, last week for their 154th meeting. In all, about 300 members either presented papers or discussions on latest developments in science and technology in their respective fields of activity. On Monday, Feb. 17, following the "All-Institute" Luncheon at the Hotel Commodore, George C. Bateman, Controller of Metals, Canadian Ministry of Munitions and Supply, spoke on "Canadian Control of Metals in the War for Democracy." Mr. Bateman who has absolute power in the field of minerals production and in granting licenses for export or import of metals, told how the Canadian minerals industry is answering the call for full production. He stated that none of his wide powers have had to be used in the production field, because of the excellent cooperation of the mining industry. Some restraint has had to be used in connection with issuing licenses for export.

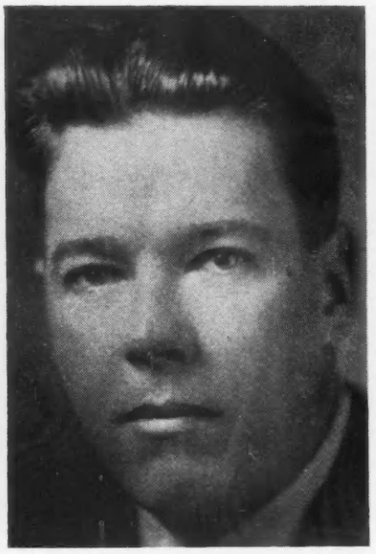
On Wednesday afternoon Dr. George Sachs, Assistant Professor of the Department of Metallurgy of the Case School of Applied Science, Cleveland, delivered the 20th annual Institute of Metals lecture on the subject, "Some Fundamentals of the Flow and Rupture of Metals."

Dr. Sachs indicated advances that scientific research is making toward finding a solution of the problem of why, when the deformation of a metal takes place until rupture occurs, a large cross-section appears to break earlier, or at lower stresses, contrary to expectation, than a smaller cross section.

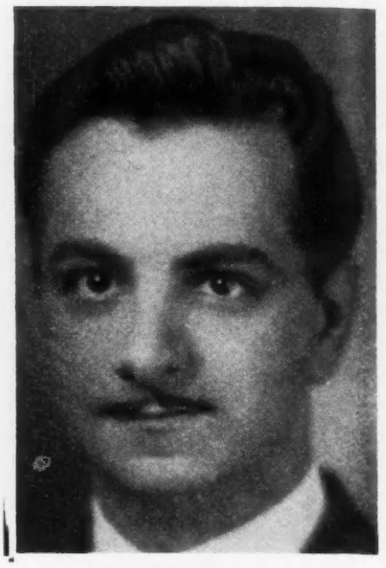
On Thursday afternoon, Alfred V. de Forest, Professor of Mechanical Engineering at the Massachusetts Institute of Technology, delivered the 18th Howe Memorial lecture, on the subject, "New Methods for the Study of Rapidly Applied Loads." Professor de Forest described some new methods of measurement of suddenly applied loads as, for instance, the load applied to the walls of gun barrels by the explosion of the charge of powder behind a projectile. What really happens when a big gun is fired, is that the walls of the gun expand and contract as the explosive gases move the projectile before them through the barrel. A slow-motion magnified photograph of a Big Bertha coughing up a projectile, might appear something like the reverse slow motion picture of a boaconstrictor swallowing a goat or a pig. The ability of scientists to devise machines to measure the expansions and contractions in a gun barrel for definite charges of explosive, help them to determine the strength of materials necessary for the construction of our big guns.

Following the Annual Banquet at the Commodore Hotel on Wednesday evening, Robert Crooks Stanley, chairman of the board and president of International Nickel Co. of Canada, Ltd., received the first Charles F. Rand Gold Metal for "distinguished achievement in the administration of the mining and metallurgical treatment of nickel, and the expansion and diversification of world markets for nickel products." The Robert Woolston Hunt Awards for 1941 went to A. B. Greninger and A. R. Troiano, respectively assistant professor of metallurgy at Harvard, and assistant professor of metallurgy at

JOHN R. SUMAN
President of the A.I.M.E. For 1941



ALDEN B. GRENINGER
Recipient of R. W. Hunt Award



ALEXANDER R. TROIANO
Recipient of R. W. Hunt Award

Notre Dame, for a paper on "Crystallography of Austenite Decomposition," a study on what happens when hot steel is hardened by quenching; and to George E. Steudel, division superintendent of blast furnace operations, Carnegie-Illinois Steel Corp. South Works, Chicago, for a paper on "Effect of the Volume and Properties of Bosh and Hearth Slag on the Quality of Iron."

Carl F. Hoffman, superintendent of blast furnaces of the Sparrows Point, Maryland, plant of the Bethlehem Steel Co., was awarded the J. E. Johnson, Jr. cash prize award for his accomplishment in developing a practice of making very low-silicon pig iron with high blast furnace temperature. This development has enabled steel makers to use more pig iron and less steel scrap in making open hearth steel, a tremendous advantage today when steel scrap is hard to secure.

Following the Annual Dinner of the Institute of Metals Division, Thursday evening, at which Laurence A. Hawkins, Executive Engineer of the Research Laboratories of the General Electric Co., spoke on the subject, "Research and Progress," the 1941 award of the Institute of Metals Division of the A.I.M.E. was presented to Dr. S. E. Maddigan and Dr. Albert I. Blank, both of the Chase Brass & Copper Co., of Waterbury, Conn. This award is made annually to authors of the technical paper of outstanding merit presented before the Division and published by the Institute during the preceding year. The title of their paper is "Recovery and Recrystallization in Long Time Annealing of 70-30 Brass."

Susceptibility of 18-8 Stainless to Intergranular Corrosion

A VERY interesting and informative paper in the Iron and Steel Division was that presented Tuesday by H. W. Russell, H. Pray and P. D. Miller of Battelle Memorial Institute. The subject covered, "A Simple Method for Detecting Susceptibility of 18-8 Steels to Intergranular Corrosion," has previously been considered to a limited degree in THE IRON AGE (Dec. 26, 1940, p. 26), but last week's A.I.M.E. paper was far more explicit as to equipment used and results obtained.

It is known that austenitic chromium nickel steels that have free carbide in the grain boundaries are subject to intergranular corrosion. It is difficult to detect such a susceptible condition in a fabricated article because present test methods require a sample section for examination and in most cases this is difficult to obtain.

The question of the nature and prevention of intergranular corrosion in austenitic stainless steels has been ably discussed by Bain and co-workers and also by other investigators. The present methods of study subject samples to corrosive conditions in such reagents as the Strauss solution, a mixture of copper sulfate and sulfuric acid. Such tests usually require at least 72 hr. to run. Various methods of measuring the degree of sensitization have been employed such as the measurement of electrical resistivity, magnetic measurements, measurement of the degree of cracking produced on bending over a mandrel and microscopic studies. The detection of carbides at the grain boundaries by metallographic polishing and etching methods is tedious and requires a skilled operator. A recent report on such methods of carbide detection is given by the A.S.T.M. Subcommittee VI of Committee A-10 and by Arness.

The investigation reported by the Battelle men was undertaken to develop a simple test procedure for detecting carbide precipitation or susceptibility to intergranular corrosion. The test is designed for use in the plant and for the testing of fabricated structures.

Carbide precipitation, the factor leading to susceptibility to corrosion, is produced by heating the alloy in the temperature range 300 deg. to 1600 deg. F. as in welding, in improper annealing or in service where such temperatures are met.

CARL F. HOFFMAN
Recipient of J. E. Johnson, Jr. Award

ALFRED V. DE FOREST
Howe Memorial Lecturer

GEORGE SACHS
Institute of Metals Lecturer

The connection between such precipitation and susceptibility to corrosion has been thoroughly discussed, as has been the use of stabilizing additional elements to prevent precipitation.

In the Battelle method, a small area of the steel under test is subjected to an anodic treatment in a cell which can be clamped onto a sample or an actual structure.

The cell and electrical circuit used are illustrated herein in Fig. 1. The cell (C) is lead joined to the steel plate (D) and insulated from it by a short piece of rubber tubing (E). The cell is forced tightly against the steel plate by a spring or clamping device. The seal formed by the rubber against the steel plate is sufficient to retain the liquid bath inside the cell. The spot treated can be made any shape desired depending on the shape of the rubber gasket. The cell illustrated polishes a circular spot about $\frac{3}{8}$ in. in diameter.

Power may be supplied by a storage battery or a battery charging rectifier. Fig. 1 illustrates a battery, the current being controlled by the resistance (R). The recommended current density is about 14 amp. per sq. in., which for the cell described requires 1.5 amp. at about 5 to 6.5 volts. The time used is 3 min.

The above conditions were chosen after a series of tests was run at current densities of 17.3, 13.9, and 10.4 amp. per sq. in. At 17.3 amp. per sq. in. it required 2 min. to obtain a good polish on unsensitized 18-8. That is, the spots produced by polishing for times less than 2 min. were somewhat frosty in appearance and could be mistaken for an indication of sensitized material. At 13.9 amp. per sq. in. it required 3 min. to obtain a good polish al-

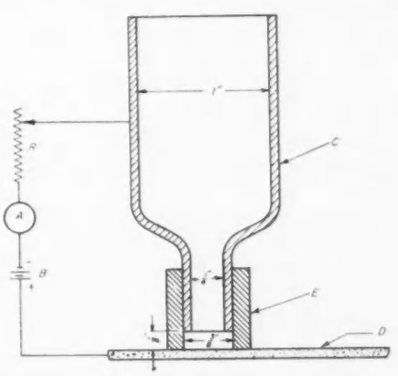


FIG. 1—Diagram of cell and electrical circuit.

though a fair polish could be attained in 2 min., according to the report. At 10.4 amp. per sq. in. at least 5 min. were necessary for a good polish. The current density of 14 amp. per sq. in. and 3 min. were chosen as most practical.

When the cell is operated at 1.5 amp. the initial voltage is usually about 7.4 and the voltage gradually falls to about 5. This is due to the lowering of the resistance in the cell as the bath heats. This resistance drop is equalized by increasing resistance (R) so that a constant current flows.

There is large gas evolution and much bubbling during operation so the cell was designed to minimize the effect of this bubbling.

The temperature effect is not serious unless the test is being applied to large objects. In such cases the mass of metal is so great that the heat generated in the cell is dissipated rapidly and a poor polish results. When this condition is recognized it can be taken care of in several different ways. One simple method is to heat the object to be tested by running hot water over it until it reaches 120 to 140 deg. F. In this manner the heat drain on the cell is lessened and a correct polish will result. Another is to construct the cell with more than $\frac{1}{8}$ in. between the lead and the sample and thus generate more heat in the bath due to increased resistance. A third is to increase the current density when testing large objects. The third method must be used with care because there is the possibility of polishing sensitized material if too much time or current is used. A little experimentation will indicate the best conditions to use for a particular sized object.

The bath consists of 60 per cent (by weight) sulfuric acid to which is added 5 cc. per liter of Glycyrrhiza Extract (U.S.P.). The cell requires about 2 to 2.5 cc. of the bath which is discarded after each test.

In most cases the presence of susceptibility to intergranular corrosion can be detected as a frostiness and grain boundary attack which is readily noticeable. Partial sensitization sometimes requires more careful examination such as viewing at various angles or the use of a magnifying lens.

Most rolled or machined surfaces can be tested without any surface preparation except removal of grease or dirt. Cast surfaces which are usually quite rough are prepared by grinding a small flat spot and then polishing with a series of emery papers to provide a fairly smooth surface. A satisfactory surface results when papers are used in the order No. 40, No. 180 and No. 1. It is not necessary to remove all scratches.

The Battelle report gave details on tests made on wrought and cast stainless steels of various analyses after the samples had been subjected to the desired heat treatments. Whenever possible the samples were water quench-annealed after heating at 2100 deg. F. for 1 hr. to insure that all the carbon was in solution or that there was no initial sensitization. All tests were made with the sample initially at room temperature and using 13.9 amp. per sq. in. and $\frac{1}{8}$ in. between lead and steel panel.

Photographs were presented to demonstrate that the naked eye is sufficient to differentiate between sensitized and unsensitized material which has been subjected to the test procedure.

The test is non-destructive and can be applied to completed structures.

No attempt has been made to correlate results with corrosion tests because the conditions for producing sensitized materials have already been well established.

Reflecting Microscope Used In Examining Open Hearth Slag

ANOTHER interesting paper in the Iron and Steel Division was that presented Wednesday afternoon by Michael Tenenbaum and T. L. Joseph, of the University of Minnesota, on "Use of Reflecting Microscope in the Examination of Open Hearth Slag."

The study and interpretation of slag conditions in the basic open hearth have been approached in a number of ways. Janitzky described the method of judging open hearth slags by the color, design conformation and texture of solid cakes. Herty developed methods for observing and interpreting the significance of slag viscosity. Relationships between specific gravity and composition have been reported by Goff. Rapid methods of analysis, particularly for iron content, are now used extensively. Rogers and Stamm studied the magnetic properties and thermo magnetic behavior of slags. McCaughey, Smith and Singewald have reported results of petrographic examinations that show the sequence of changes in the constitution of the slag as refining progresses. These changes in the constitution of the slag are important because they embrace the active portion of the slag.

While petrographic investigations have provided valuable information, the time required for the preparation of thin sections limits the use of this information in slag control. A more rapid method of observing changes in the mineralogical composition is needed for making corrective additions to the furnace. It was the purpose of the Tenenbaum paper to discuss the examination of a single surface of the slag in reflected light. Suitable samples for this type of observation can be prepared in less than 5 min.

In order to identify the minerals present in solid slags it is necessary to use the petrographic microscope. Once identified, however, many of the minerals can be easily recognized when viewed in the reflecting microscope. Consequently, as a basis for this study, a large number of slags were studied both in transmitted and in reflected light.

The similarity of microstructures of slag as observed by transmitted and by reflected light became evident in a preliminary study. Two typical examples of this similarity are shown in Figs. 2 and 3. Fig. 2 shows the microstructure of the same slag in transmitted and in reflected light respectively. The sample was taken during the early stages of the refining period of a low carbon heat. The transparent phases that appear white in transmitted light appear gray in reflected light. On the other hand, the dark phases seen in transmitted light appear white in reflected light. This is due, of course, to the degree to which light is reflected by the various phases in the slag. Color differences which are not evident in Fig. 2 aid in distinguishing the various phases in transmitted light.

In the same way, Fig. 3 illustrates the similarity in the microstructure of a more basic slag when observed in transmitted and in reflected light. Again, the general

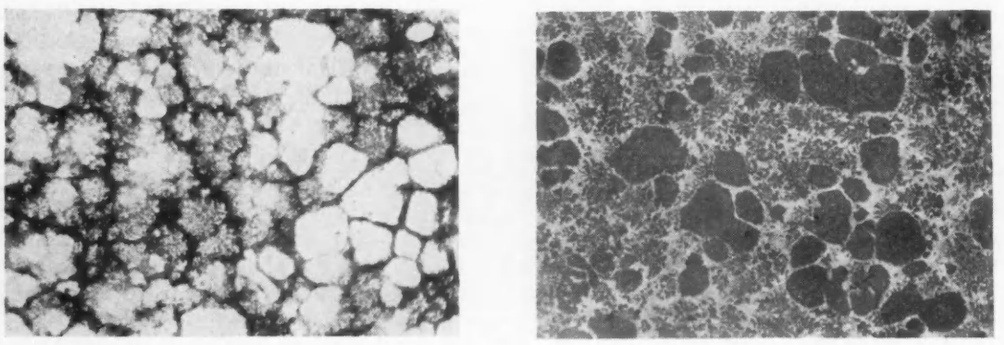


FIG. 2—Photomicrographs of same slag in both transmitted (left) and reflected light (right). Note the similarity. At 100 diameters.

structural characteristics are the same in both cases. Dominant phases identified in transmitted light are readily distinguished in reflected light.

All the slag samples studied in the investigation were taken during the operation of open hearth furnaces in a single plant. Slag samples were taken at various stages of selected heats from meltdown to tap. The samples were poured in the form of slag pancakes and viscosimeter tests. The sections used for petrographic studies were taken vertically through the pancake about ½ in. from the outer edge. Standard methods were used in preparing the thin sections used in transmitted light studies.

The location of the surface examined in reflected light was comparable to that of the thin section. A specimen of any convenient shape could be used for this study. The rough edges of the surface to be examined were removed on a coarse grinding wheel. The major part of the polishing action was accomplished on carborundum paper in which the abrasive particles had been oriented to give maximum cutting efficiency. Successive treatment on 00 paper and a wet felt cloth completed the polishing action. The time required to prepare a single sample for examination did not exceed 5 min. For those specimens which required etching, a 0.5 per cent HC1 solution was universally adopted.

The heats discussed and the photomicrographs presented by Mr. Tenenbaum illustrate the feasibility of using the reflecting microscope in the rapid study of basic open hearth slags. Since less than 5 min. are required for the preparation of a satisfactory sample for microscopic observation, such a study can be carried out simply and rapidly. The samples used for this investigation were taken from slag pancakes, and, therefore, reflected light studies could be carried out in conjunction with visual examination of the solidified slag.

During the study numerous features were noted which assist in the microscopic examination of slags in reflected light. The more significant of these are summarized as follows:

(1) Early acid slags are acicular in microstructure and must be etched to be distinguished in reflected light.

(2) Traces of the acicular structure persist in more basic slags. When the lime silica ratio of the slag exceeded 1.8, this acicular tendency no longer exists.

(3) Dicalcium silicate begins to appear in appreciable amounts as soon as the lime is up and begins to go into solution. This compound occurs as gray primary appearing grains which usually exist in clusters.

(4) This silicate exists first as a solid phase in the molten slag. As the slag matures the number and size of these grains decrease, indicating its solution.

(5) The solution of the solid dicalcium silicate is usually accompanied by a decrease in the slag viscosity.

(6) On freezing, the liquid part of the slag appears as an intergrowth of the light oxides and ferrites together with the gray dicalcium silicate.

(7) Mature slags are those in which all of this dicalcium silicate has gone into solution and therefore are composed entirely of the intergrowth structure. This structure indicates a slag with a lime-silica ratio in excess of 3.00.

(8) Two other compounds, tricalcium silicate and calcium ferrite, can be detected in reflected light. The compound Ca_3SiO_5 appears first as gray, lath like grains and in more mature slags as long, narrow needles. The least basic slag in which this compound was noted had a lime silica ratio of 3.1. The compound $CaFe_2O_4$ appears as short white needle like grains within the structure. The least basic slag in which the needle like grains were observed had a lime silica ratio of 2.8.

The structures discussed in the paper were observed on slags from a single plant. The results accordingly apply directly to a particular open hearth practice. By carrying out similar observations, standard microstructures could be established for slags from heats of various grades of steel. Such standard microstructures could then be used for reference in any particular practice.

Bessemer Process and Product Examined in Two Papers

THE past several years have witnessed what, in the light of future events, may aptly be called the "Rebirth of the Acid Bessemer Process." The increased attention given to the technical and metallurgical details involved in the production of bessemer steels has been exceedingly fruitful, and certainly indicates the value of further research and plant development work. Indicative of this increased attention were the two papers on the bessemer process presented to the

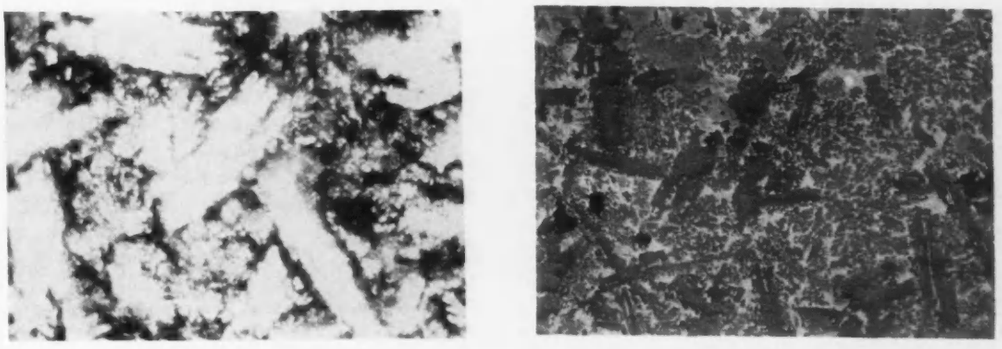


FIG. 3—Photomicrographs of same slag in both transmitted (left) and reflected light (right). At 100 diameters.

Iron and Steel Division, Thursday morning—"Quality Control of Modern Bessemer Steel," by L. D. Woodworth, Carnegie-Illinois Steel Corp.; and "Photocell Control for Bessemer Steel Making," by H. K. Work, Jones & Laughlin Steel Corp.

In his paper Mr. Woodworth pointed out that in times like these, when the steel making capacity of the country is operating at a maximum rate to supply materials for the national defense program, it behooves the bessemer operator not only to strive to increase production but also to maintain a high standard of quality. The opportunity is ripe, it seems, to recapture fields of application once considered the birthright of bessemer steels, but supplanted in recent years by open hearth grades.

Of course, this involves cooperation all along the line, from the blast furnace operator to the metallurgical contract man and salesman, according to Mr. Woodworth. The metallurgist's part in this program involves the study of the many steel making variables and the measures necessary to take to insure constancy in the finished product. In addition, it is equally important that the knowledge gained be disseminated widely to insure the wise application of bessemer steels in new fields.

The merits of bessemer steels for certain jobs are well understood. The combined properties of good weldability, machinability and stiffness are unique and fully explain the strong entrenchment of bessemer steels in certain fields, e.g., skelp for small size butt weld conduit, screw steels machined in automatics, and certain tin plate applications.

With the thought in mind of comparing such physical properties as tensile strength, ductility and impact strength for bessemer versus open hearth steels under present conditions of closer bessemer control, a number of bessemer blows and open hearth heats were tested.

Machined test pieces 0.505 in. in diameter with an 8-in. gage length were pulled. Data obtained on ultimate strength against carbon content shows that for equivalent carbon content bessemer steel has on the average 15,000 lb. per sq. in. greater tensile strength and, conversely, for the same tensile strength bessemer steel requires on the average 0.14 per cent less carbon. The average phosphorus content for the bessemer steel was 0.090 per cent, while for open hearth it was 0.013 per cent. It would seem that the higher strength is attributable to the higher phosphorus content, although it was not a part of Mr. Woodworth's investigation to prove this inference. These tests were made on bars in the "as rolled" condition, but a similar set on normalized material showed practically the same results.

Fig. 4 shows that the ratio of yield point to ultimate strength is considerably higher for bessemer steel. This valuable characteristic of bessemer steels has probably not been fully appreciated in the past.

The elongation in 8 in. particularly in the lower range of ultimate strength, is higher in bessemer steels, as shown in Fig. 5.

It has been the general belief that the impact strength of bessemer steel was poor in comparison to open hearth steel. However, Fig. 6 shows that the two types of steel are fairly comparable in this respect for any given ultimate strength, even though the bessemer steel will tend to have a coarser structural grain size because of the

(CONCLUDED ON PAGE 106)

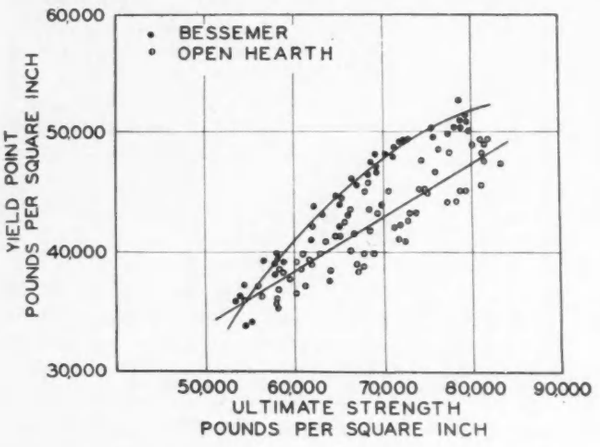


FIG. 4—A comparison of the ratio of yield point to ultimate strength for bessemer and open hearth steels.

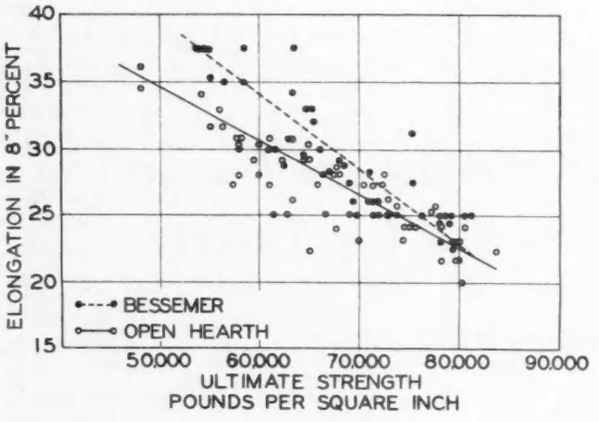


FIG 5 — Comparison of the elongation of bessemer and open hearth steels for equivalent ultimate strengths.

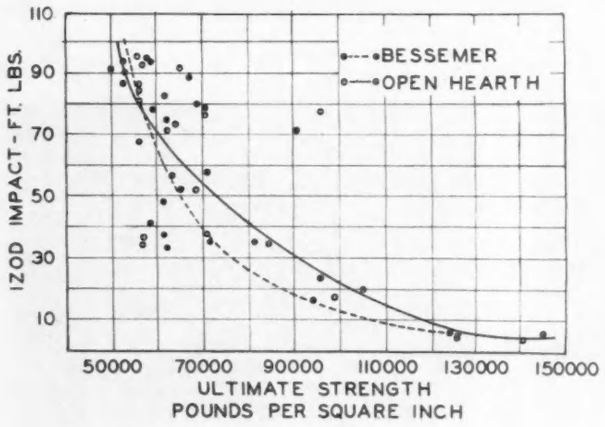
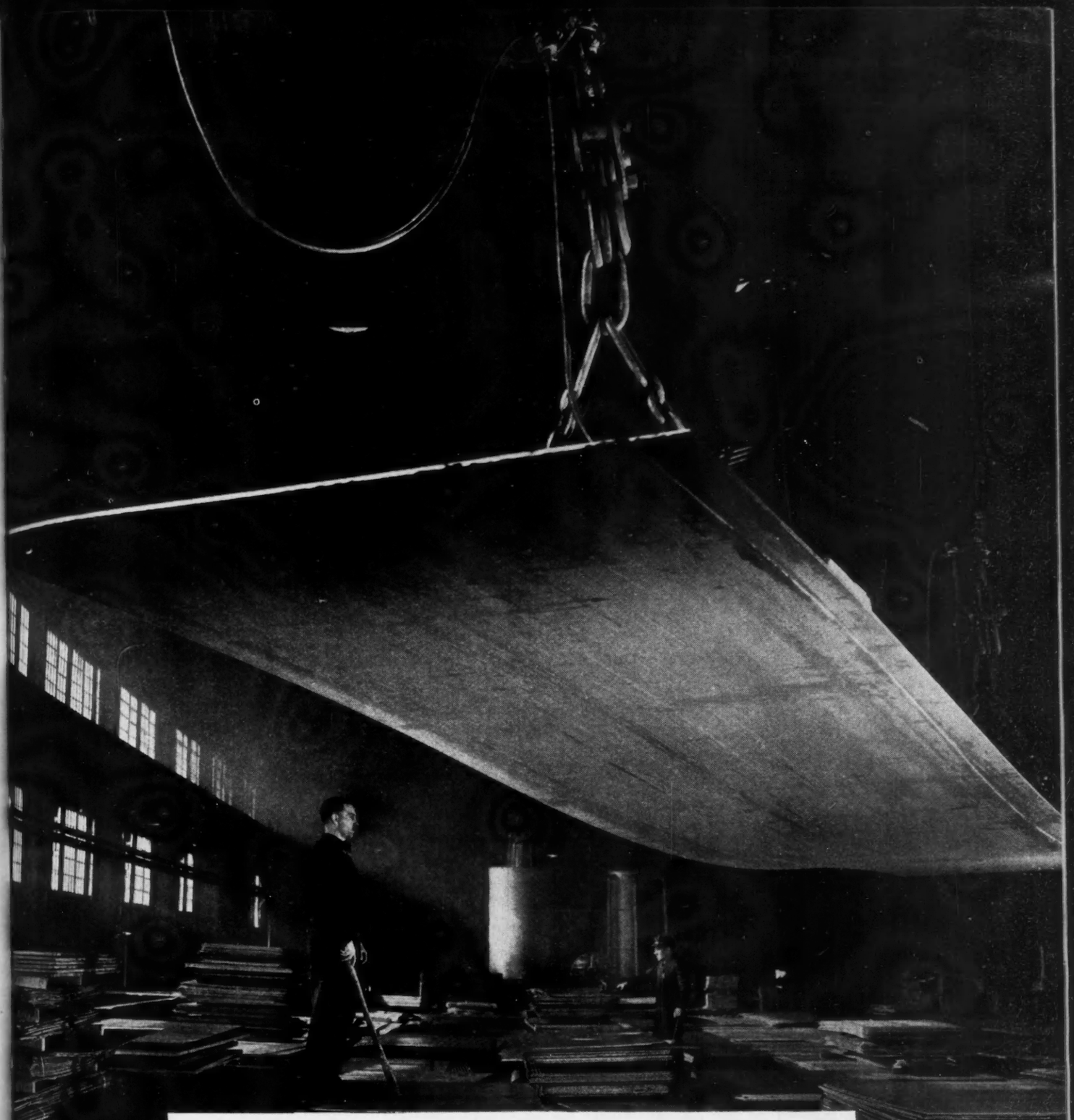


FIG. 6 — Comparison of the impact strengths of bessemer and open hearth steels for equivalent ultimate strengths.



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On The Assembly Line

BY W. F. SHERMAN
Detroit Editor

• Die shops becoming busier in preparation for 1942 automobiles . . . New materials to be used as substitutes for metals that are largely preempted for defense manufacturing . . . Training of defense workers in Detroit plants assumes large proportions.

DETROIT — Die shops which have been quite barren of work since last autumn have struck their stride again and are now generally filled with work. This marks a welcome change for the local die industry because there was a period during the fall when some die manufacturers had given up any hope that there would be 1942 automobile model work for them to do. Release of 1942 die work was welcomed also by the foundries which specialize in this field.

This beginning of die work for 1942 models does not indicate that all the planning for next year's cars has been completed, although designs have been agreed upon and much of the work necessary to assure production next fall has begun. There still is a multitude of details to be worked out—many more than in any previous year. The necessity for selecting substitute materials and parts in many instances is causing engineers and procurement staffs to burn the midnight oil.

Plating suppliers report increasing difficulties that are likely to affect the automotive use of chromium and nickel plate. Automobile company representatives are in almost constant sessions on these problems. Even more important is the necessity for eliminating the use of zinc. There is reason to believe that die cast radiator grilles will be among the first items scratched off 1942 designs. There is rumor of a plastic grille and also of plastics covered with an electrodeposition of bright metal, although no hint has been given of the process by which the latter could be accomplished.

New Materials To Be Used

This hunt for substitutes probably will go on right up to the time when new models go into production. However, invariably research comes up with the right answer and some new materials are already making their appearance in promising forms. In the refrigeration industry there is an excellent illustration of this. The manufacture of refrigerator ice cube trays has made extensive use of aluminum stampings, but a quick changeover to some other material is indicated as necessary now. One of the efforts most likely to succeed is making use of a steel stamping, covered with a satiny-looking lead alloy and coated with a transparent plastic. The result is a tray that looks very much like the aluminum tray to which the householder has become accustomed. This is one of the most ingenious substitutions seen so far.

Gasoline storage drums, which will be used in large quantities by the defense forces because refueling from stationary pumps is not practicable for mobile forces, have threatened to put a tremendous drain on tin supplies but a low-tin lead alloy is already being used successfully, it is understood. Meanwhile, the switch from tin containers to those lined with synthetic lacquers has already been started by so many industrial users of drums and cans that it is difficult to get delivery of even the synthetic lined tanks. For the general use of low-tin alloy coatings, greatly improved methods of cleaning the base metal will be necessary, investigators report. Some interesting solutions to this problem are already being offered.

The shortage already apparent in some quarters where synthetics have been employed is likely to continue because rapid changeover from original materials puts a tremendous load on the industry making substitutes. It has become well established that the demand for synthetic rubber for special defense purposes will continue so great that it will be a long while before synthetics can be substituted for natural rubber—in tires, for instance. The Neoprene situation has been an example. U. S. Rubber Co. has used considerable quantities of this synthetic in the course of its regular commercial operations, but near the end of last year could not obtain deliveries. In the plant was only one small box full of the synthetic. It was kept in a safe and was used only sparingly for experimental work. The first shipment in January amounted to only 1000 lb. Some of the other synthetics are still sufficiently plentiful but the drain on them is becoming apparent, also.

Aircraft fabricators have not yet found it advisable to store aluminum in the office safe, but campaigns are underway to conserve this material and eliminate wastage. In some of the automotive body plants which are training workers to do aircraft sheet metal work and riveting it has been necessary to keep an eye on the wastage problem all the time. Briggs workers in training were told by one of the executives recently, it is understood, that they have used and wasted enough rivets to assemble 16 airplanes—however, only a few sets of wings have been shipped.

Production of Midget Truck Speeded

The successful attempts of industry to widen bottlenecks, cut red tape, and adopt new methods when old ones prove too slow, are illustrated by another incident revealed in connection with the rush order

PRODUCTION: *Up 50%*

A certain New Jersey manufacturer reports this very good saving in tapping costs. This screw machine is turning out a part made of 3½% nickel steel. Tapping a ⅜-24 hole was the "bottleneck" of the job until they switched to "G. T. D. Greenfield" Taps. The solution recommended was a roughing cut with a *"Gun"* Tap and the last .010 of an inch removed by a ⅜-24 High Speed Steel Ground Thread "G. T. D. Greenfield" Tap. Production on the whole job jumped 50%.

To manufacturers everywhere who must use every possible means of increasing production, we say—"Have you thoroughly investigated 'G. T. D. Greenfield' Taps? —Ground Thread High Speed Steel for fast, accurate work; *'Gun'* Taps for 'through holes'; *'Maxi'* (the special surface treatment) for stringy or abrasive materials." "G. T. D. Greenfield" Engineers will arrange a test at your convenience.

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to produce the first of the Bantam trucks for the Army. With 49 days to produce the first sample and 30 additional days for the production of 70 cars on the initial order—and no time allocated for tooling—Harold E. Crist, factory manager of Bantam, and his production crew worked out many unusual hand production methods. For instance, the frame side rails, which are similar to the Chevrolet box-section members, apparently could not be produced without expensive tooling for which there was no time. Crist obtained strip steel, sheared it, formed it in a break to make a U-section with flanges. This was covered on the open side with strip steel. To form the drop center of the frame, V-sections were cut, the frames bent to form the proper contour, and welded. The midget car, with hand-made frame, was one of the few military "pilot" models to pass acceptance tests without penalty for failures.

Willys at Toledo is beginning production immediately on the 1500 midget trucks which the Army ordered a short time ago. The start of production will coincide with Willys usual spring pick-up in passenger car production. Ford already is in production on its order for 1500 and is, by the way, using a new name for these pygmy vehicles—they are now semi-officially known as "blitz buggies."

Training Programs Enlarged

Defense training programs still occupy the spotlight. General Motors announces, through C. E. Wilson, president, "by the time we are running 'in high' on our defense orders, we expect to require a trained manufacturing personnel of upward of 60,000 workers." One of the largest worker training programs in the history of American industry has been undertaken. Trainees are being taught specific operations only. Instruction periods are short, turnover is large. Allison already has trained about 3700 men on the job, working as assistants to experienced operators, while AC Spark Plug division will train 3000 workers for its machine gun plant by giving individual instructions on machine operations. Hyatt Bearings division is training defense workers by the "vestibule school" method. The Saginaw Steering Gear division has adopted the system of training groups of employees under individual instructors who give their charges one hour of classroom work a day and supervise them in the shop the rest of the time.

Other divisions of General Motors have adopted training methods best suited to their individual circumstances. Many of them encourage trainees to take related courses on their own time, either in public schools or in classrooms set up in the plant. The AC plant in Flint, and New Departure in Connecticut, have worked with local education authorities in setting up pre-employment shop courses. Yellow Truck & Coach has established similar relationships with local CCC camps near Pontiac, Mich.

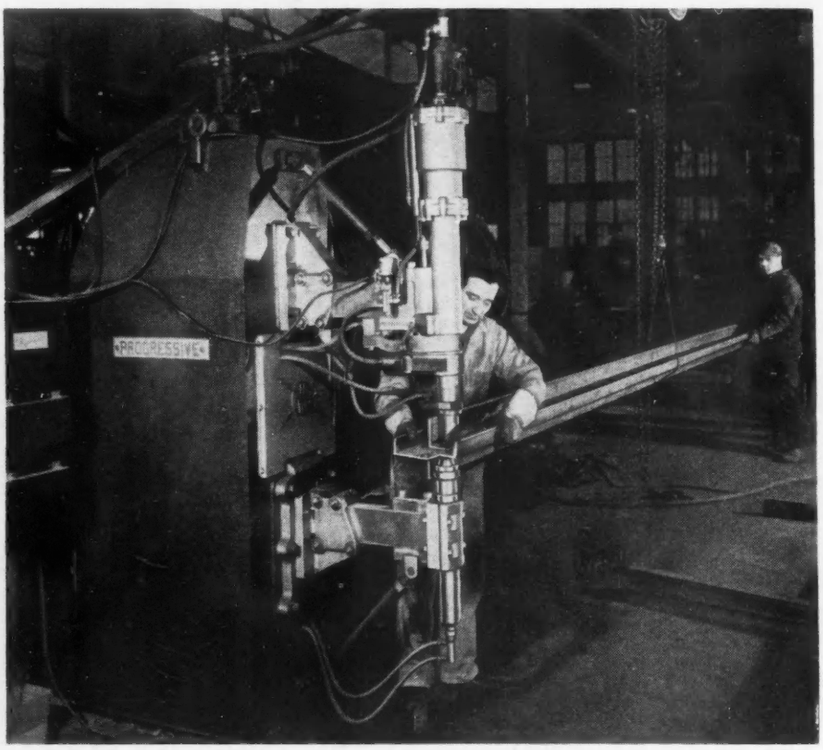
Cadillac, which is manufacturing Allison parts, has evolved a unique training method under which inexperienced workers are given jobs in what the older men in the plant call "Boystown." This is a department devoted to the hand-shaping and polishing of parts, a simple operation but one that is new to the automobile industry.

All of this training work is under direction of B. D. Kunkle, vice-president in charge of personnel. General Motors' long-established institute at Flint coordinates the work.

Auto Output Still High

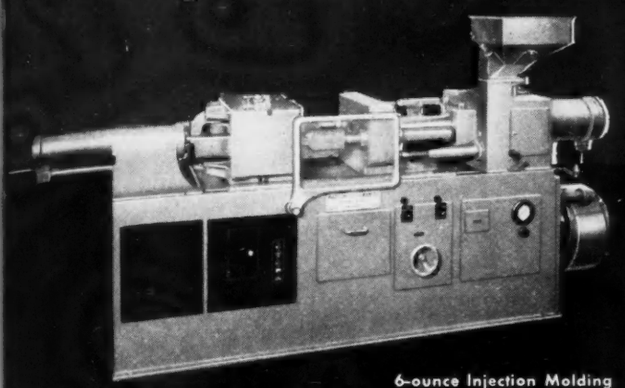
Automobile production continues in the higher brackets, with output for the past week estimated at 129,240, compared with 127,510 in the previous week and 102,670 in the corresponding week of last year, according to Ward's Reports, Inc.

WITH APPROXIMATELY 80 per cent of steel and iron fabrication being done entirely in the shops, resistance forge welding is playing an important part in the structural steel shops of Taylor & Gaskin, Inc., Detroit. Up to 20 tons per day of structural steel is fabricated by spot welding, eliminating all assembly punching and riveting from the work and reducing the need for specially skilled help since the welding is almost entirely automatic. Under regular production operating conditions it is expected that a conveyor feed will be used but for the present the equipment is being used for a variety of work and hand loading is employed. This strut assembly is 20 ft. long and consists of one 8 in. panel section to which are welded two 4 x 3 x ⅜ in. angles. The assembly is tack-welded to position the three parts and delivered to the welding station on the Progressive machine shown here.

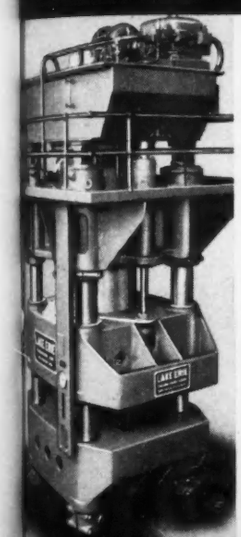


OILGEAR FLUID POWER

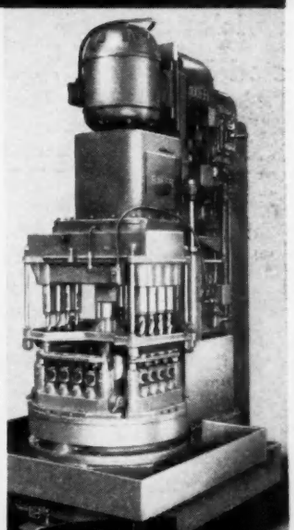
ties production to *Zooming Demands*



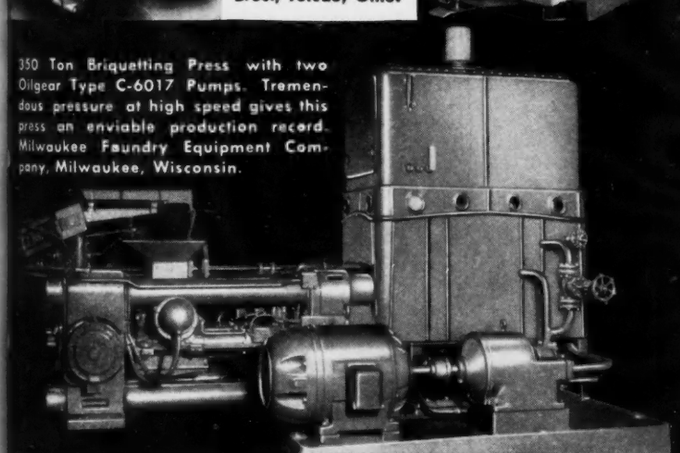
6-ounce Injection Molding Machine with Oilgear Type DP-3517 Pump for high cycle speed, variable working pressure, easy control and holding pressure without excessive heating or power loss. Watson Stillman Co., Roselle, N. J.



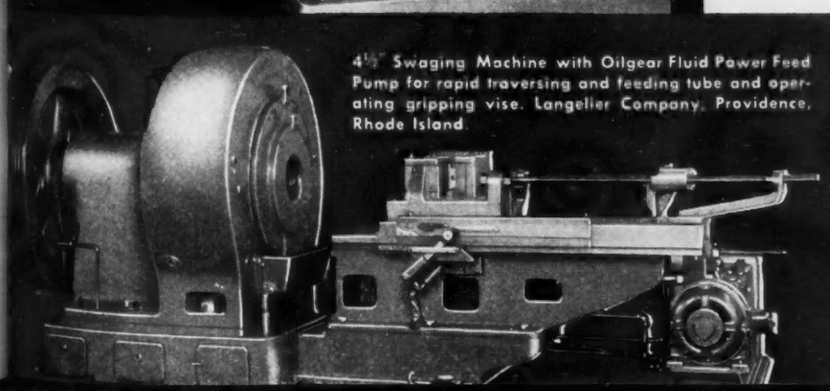
2500 Ton Forming Press equipped with Oilgear Type DX-10025 Pump... Remote control... 250" per min. rapid traverse closing speed...9.5" per minute high pressure pressing speed. Lake Erie Engineering Corporation, Buffalo, N.Y.



Multiple Spindle Vertical Drilling and Reaming Machine with Oilgear Fluid Power Feed Pump Unit. Feeding Pressures up to 18,500#. Drills as many as 33 pieces per hour. Baker Bros., Toledo, Ohio.



350 Ton Briquetting Press with two Oilgear Type C-6017 Pumps. Tremendous pressure at high speed gives this press an enviable production record. Milwaukee Foundry Equipment Company, Milwaukee, Wisconsin.



4½" Swaging Machine with Oilgear Fluid Power Feed Pump for rapid traversing and feeding tube and operating gripping vise. Langelier Company, Providence, Rhode Island.

To produce thousands instead of hundreds... and tons instead of pounds is the tremendous job industry is facing today. Factories must be reorganized . . . and in some cases completely re-tooled to keep up with today's urgent demands. The colossal task of re-tooling an entire nation of industry for "high gear" production lies in the hands of machine tool designers and manufacturers.

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Washington

BY L. W. MOFFETT
Washington Editor

• Attorney General Arnold indorses, by implication, negotiations between defense agencies and industry groups on prices and priorities . . . Says there is no anti-trust law violation if priorities are directed by government.

WASHINGTON—Since the advent of the armament program, defense agencies of the government and business groups alike have been wary of the Sherman Anti-trust Act and the vigorous enforcement policies advocated by Assistant Attorney General Thurman Arnold, head of the Justice Department's Anti-trust Division. The first official apprehension was displayed last August when members of the National Defense Advisory Commission sought a delay when the Justice Department announced its intention to prosecute a civil action against 22 major oil companies for the purpose of separating control of oil pipe lines and the marketing of oil products.

Commission officials wanted to investigate the action contemplated at that time, fearful of the possible impact on the defense program. Subsequently, Mr. Arnold agreed to a minor modification of the suit but was emphatic in his statement that he saw few occasions where the defense issue could be a factor tending toward relaxation of his vigorous anti-trust enforcement policy. On the contrary, he took the position that with a large-scale armament program in full swing, there is a genuine need for his division to increase its vigilance.

Anti-Trust Laws Given New Life

His most recent pronunciamento on the subject, made last week while he was testifying before the Temporary National Economic Committee, is regarded as of unusual significance because it comes at a time when an increasing number of business men are being brought together under government sponsorship and urged to adopt policies and practices with respect to prices and priorities which ordinarily would be in restraint of trade. Many groups find themselves together for the first time since NRA, during which era the anti-trust laws were put on ice for the duration of the Blue Eagle emergency.

Under the present emergency, the anti-trust laws are not only remaining intact but, under Mr. Arnold's program, are being given new life. Industries like the scrap trade, which has been asked to adhere ultimately to a $20 price for No. 1 heavy melting steel at Pittsburgh and to submit schedules of price differentials for other points, and dealers handling used machine tools, who are covered by an order fixing maximum prices, have been showing increased concern lest the very activities recommended by one arm of the government would be held by another arm to be in violation of the anti-trust laws. Business groups want to know specifically what they can and cannot do without running afoul of the Sherman Act.

These questions are answered rather completely in Mr. Arnold's latest statement, in which he impliedly indorses all pending negotiations between defense agencies and industry groups on the subject of price and priorities.

"There are indications that in some instances priorities must be established," Mr. Arnold told the committee. "These of course are things which could not be done by private industry without violating the anti-trust law. That doesn't mean that the anti-trust laws prevent any government agency from establishing these priorities, and the reason is this: The anti-trust laws attack conspiracies in restraint of trade.

"If a government official, acting in what he conceives to be his authority under any legislation, under any war powers, directs each of 100 business men to do a certain act, to take certain action, and each of those business men obeys the direction, there is no conspiracy between those business men. Now that just seems to be an obvious statement of fact.

"Therefore, the anti-trust law does not cover the situation. That law that will prevail is the easy method advocated by some, even advocated in the public press by some people, that we should suddenly delegate to these business men, in their position of divided loyalties, the power to fix prices and to fix priorities. That cannot be done. Such delegation is unconstitutional.

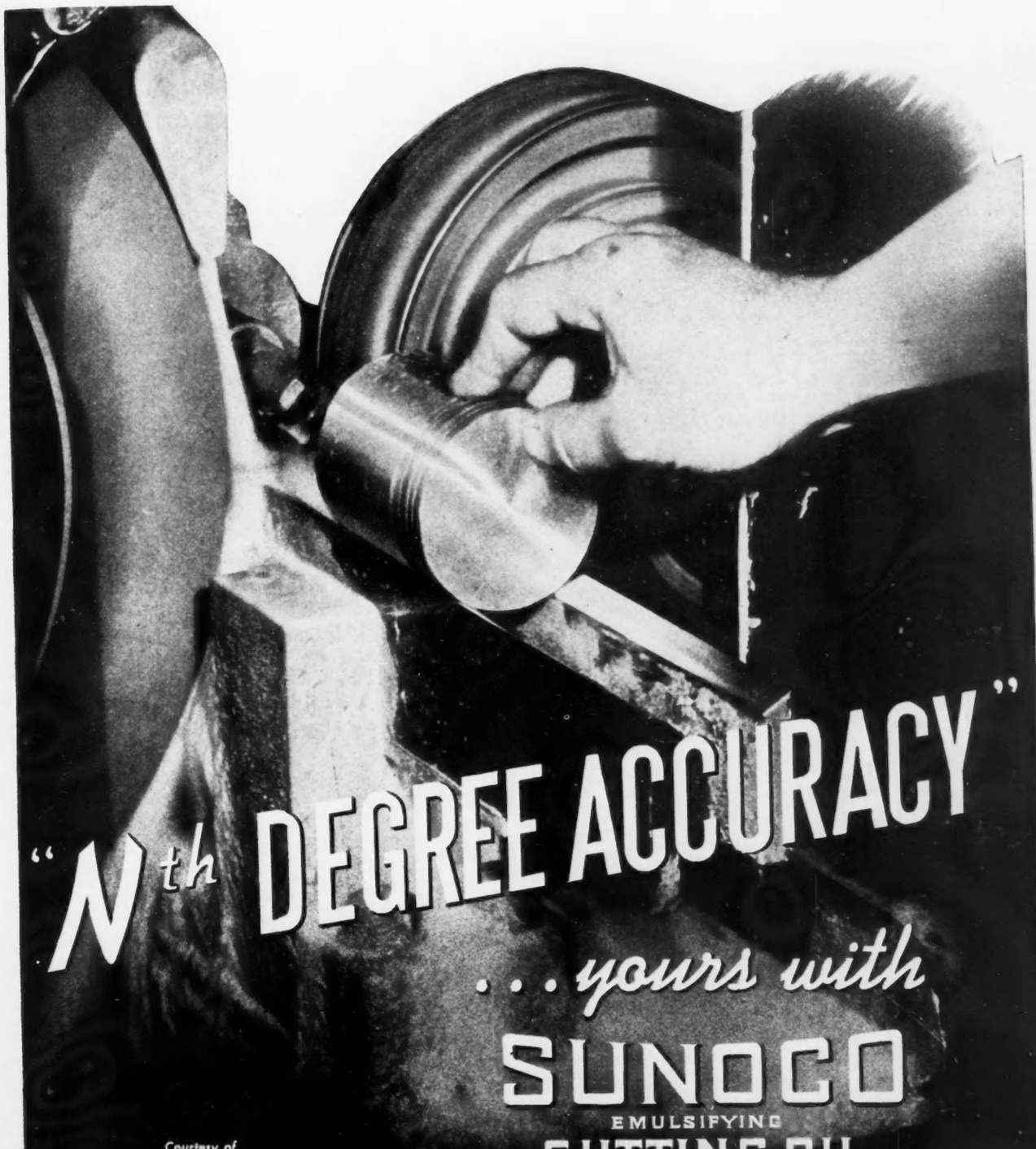
Government Bureaus Take Responsibility

"There is no reason why it should be done in time of war. There is no reason, as a practical matter, why people with axes to grind, even in time of war, should be delegated the task of fixing their own priorities. But if the government officials direct these priorities or direct any action, then there is no conspiracy.

"What the anti-trust laws do, in effect, is to compel the government bureau engaged in defense activity to take the public responsibility of giving such directions as are necessary, to study those directions, those priorities—whatever they are—and to do it in public, in the open, so that the directions are constantly subject to public examination. That's all the more necessary in time of war.

"So I want to make it perfectly clear what the anti-trust laws do in this situation is to prevent any government agency under any guise of war to turn over to a group whose profit-making interests are necessarily involved, this government power to handle the defense program."

There have been suggestions since the beginning



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of the defense program that the anti-trust laws were out of place in the defense picture. Bernard M. Baruch, chairman of the War Industries Board during the first World War, several months ago announced that he favored giving the President emergency power to suspend the anti-trust laws as a means of speeding production for defense. Although there have been similar recommendations advanced by others, there appears to be no disposition on the part of Congress to move in that direction. Some members have said privately they feared that a move to temporarily abrogate the anti-trust laws would conjure up the old controversy around which the ill-fated NRA revolved.

Mr. Arnold, who of course would be the first to protest against any statutory relaxation of the Sherman Act in the interest of national defense, even goes a step beyond his rule-of-thumb that government supervision takes the stigma away from pricing and priority negotiations. He implies that even a private understanding between business men, without government sponsorship, might be sanctioned if it could be shown that such a step was necessary in the name of national defense.

The head of the anti-trust division, however, voices grave doubts that such circumstances could exist. But in the event they do, he has recommended that the matter be put up to the courts, under the rule of reason, to determine whether the imperativeness of the case might make such a combination possible.

"However, during the last year I have asked somebody to put me a hypothetical case of that kind, and as yet I haven't got the case," Mr. Arnold told the TNEC. "When such a case arises, we will look at it, but at present it has been beyond the imagination of anyone."

Mr. Arnold made it plain to the committee that, while there will be no conspiracy, the responsibility—for any mistakes made when government representatives supervise the collective action by business groups—must not be placed upon the government agency directing the action.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

Aluminum Co. Finds OPM Action Helpful

Pittsburgh

• • • Establishment of mandatory priorities for aluminum will not materially change the present practice of the Aluminum Co. of America but will clarify and improve the procedure, according to a statement made by a company spokesman here early this week. The growing need for rapid deliveries on government contracts leads to "some shortages" for civilian uses, it was said. The company is said to regard the present pinch as more or less temporary, due not only to regular customers building up inventories but also because defense industries were adding to stock piles.

Aluminum Group of 10 To Work on Prices

Washington

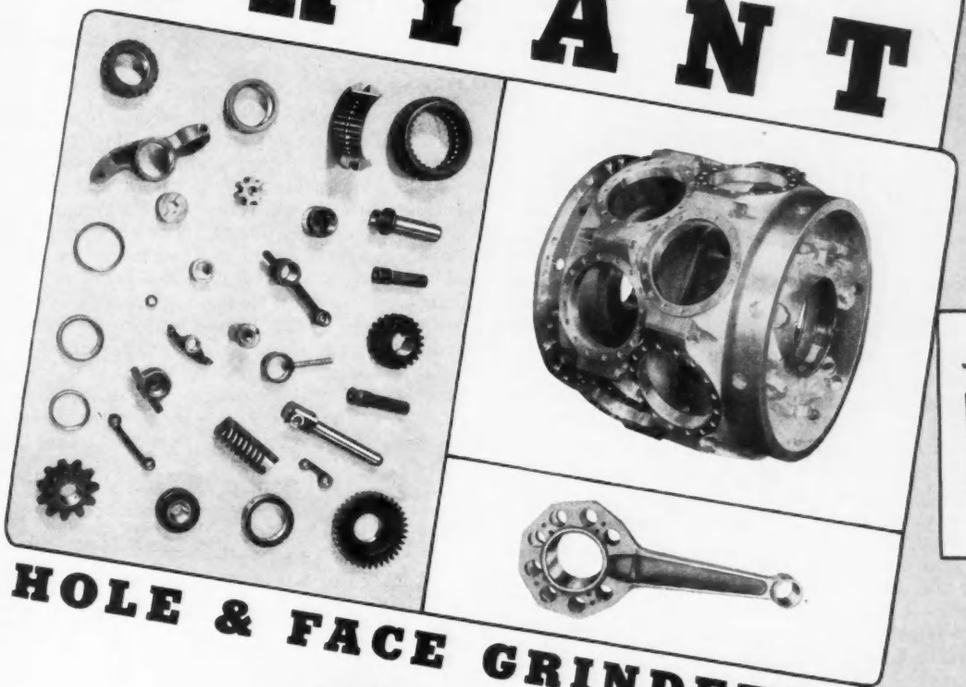
• • • A committee of 10 representatives of the aluminum industry to work with the defense commission's price stabilization division will be set up as a result of vote taken at a meeting on Feb. 18 between industry representatives and Acting Director C. A. Bishop of the price division.

The committee will be composed of two representatives from each of the five groups represented at the conference — primary producers, secondary smelters, foundries, dealers, and fabricators.

Conferees were represented as agreed that many fabricators of aluminum products are withholding scrap from the market, thereby increasing what was described as "the present unbalance situation." Also evident, it was said, are the building up by some fabricators of inventories and the buying for future requirements.

"It was also found that a few scattered small dealers are withholding aluminum scrap from the market, although that was not deemed a significant factor in the present situation," Mr. Bishop reported. "Most dealers have been playing ball pretty well."

BRYANT



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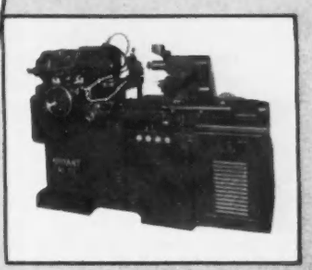

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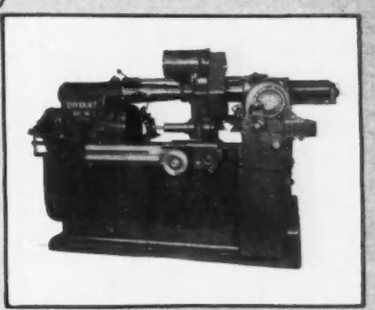

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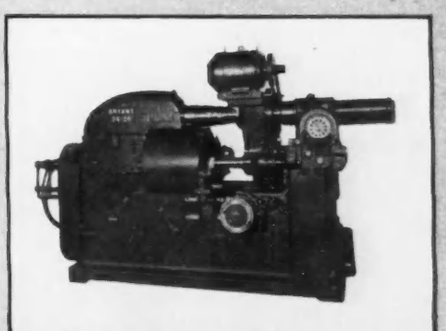

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Fatigue Cracks

BY A.H.DIX

He Couldn't Make Head or Tail of It

• • • Today's soldiers seem to be much nattier than the last war's. The supply sergeants' rule then was, when handing out uniforms, *"Try this and if it fits you can change it."* But today's khaki suits seem to have been designed by someone whose knowledge of normal anatomical bulges and dents is based on more than hearsay. As it is now you can hardly tell a one-week trainee from a major until you get close enough to see the Brooks Brothers' label.

Our franchise requires us to keep the items on this page reasonably within the line of duty, and it will be quite a trick to find an excuse for ringing in uniforms, but we will try. A privileged character we knew in the last war achieved a novel and bewildering effect by wearing an artillery button on his cap, an engineer's button on one side of his standup coat collar and an infantry button on the other. We thought of him when one of our wandering editors told us that, in search of grist for your mill, he ran across a monster 18 ft. gap lathe with a headstock marked "Monarch" and a tailstock marked "Fitchburg."

He found that the mongrel mastiff had come by its dual sires honorably. The user, a manufacturer of big gear sets, builds his own equipment, had had the tailstock and bed made by the Fitchburg Engineering Co., steam engine builder, and the headstock by the Monarch Machine Tool Co.

Knuckle-Wrapper

Can The Iron Age refrain from using **non-corrosive** when it means **non-corrodible?** See page 68 of the Feb. 13 issue for the current crime, a henious one and very common. An extremely nice sense of the correct meaning of words is lacking in many of those who try to write for publication.—**A. D. Williams.**

We showed the letter to the offending member of the brains department, who said, *"There ain't no difference, is there?"* He has been given a dictionary, ten raps on the knuckles, and has been forced to write *non-corrodible* 200 times on his typewriter.

(Note to A.D.W.: The correct spelling is *heinous*, and the pronunciation isn't hee-nee-us, but *hay-nuss*, as in *"Hey, nuss, have I still got a fever?"*)

Two-Dimensional Cars

"When new cars are announced the public is interested mostly in price, improved performance and engineering gadgets, coupled with the new silhouette (if any)," Capt. H. L. Towle said.—**From "On the Assembly Line."**

We think the automobile people would be making a grave mistake if they abandoned the silhouette. It is very handy in parking a 16 ft. car in a 19 ft. space. It is also useful when simonizing for without a silhouette it would be hard to tell where the car left off and the atmosphere began.

"K" Is Seen But Not Heard

• • • "Moff" writes finis on the Knudsen pronunciation puzzle with this:

"It's nood'sen. The "k" is silent like the plus in the Federal treasury surplus."

Gift—Offered and Asked For

If you have not yet received the index of editorial articles for the second half of 1940 you can get one for nothing by writing to us at 100 E. 42nd St., New York. And if you could part with any or all of your copies of the Jan. 9, 16th, 23rd, 30th and Feb. 6 issues, we would be grateful to you no end, for an unexpectedly heavy demand cleaned our shelves. Of course, we would extend your subscription proportionately.

Young Minds Crave It

• • • We thought our capacity for absorbing praise was infinite. But one of our more exuberant staff members manages to exceed our yield point. He says that one of the key executives of an important plant in the industry prefers The IRON AGE to all other publications. That statement is entirely credible, but he follows up with, *"He takes it home every week, reads it from cover to cover, and his two boys, aged 14 and 16, do likewise."*

We don't believe it. In fact, we doubt that anyone reads this or any other trade paper from cover to cover. The IRON AGE is edited for the use of men in different capacities and no one issue is intended to have a universal appeal. Surveys reveal that reading of the different sections runs from 32 per cent to 92 per cent, with the editorials at the top rating. Practically every mail brings us letters reading:

"We never fail to read the editorials, which almost invariably express our own opinion of the matter discussed."
"Your editorials are the best ever."
"The editorials by Mr. Van Deventer are the tops."

Publishers expect editorials to have a relatively low reader-rating. They run them more for the sake of convention than because of any demonstrated need or demand. You might compare them with the bow on your hat. You don't use it, but you'd miss it if it were absent. The tremendous amount of attention that IRON AGE editorials attract is the marvel of the trade paper publishing business.

But to get back to our knitting. We can't get over those two boys, 14 and 16, poring over your favorite family journal when they should be out skating, doing their homework, or reading *Finnegans Wake.*

Mass Murder in the Antipodes

• • • An echo from the South African member of this page's army of 18 certified readers ties up two items, one about *Printers' Ink's* squawk regarding the common use of blitzkrieg and the other concerning *debugger*, which here is a wind scoop fastened to the automobile radiator ornament to prevent insects from squashing their little lives away against the windshield.

Our correspondent informs us that there a debugger is an insect exterminator, and that the debugging business is practically depressionproof, for, he says, bedbugs are as common in South Africa as mosquitoes are in New Jersey. They are, in fact, he says, *de rigueur.* If this is so it is too bad, but not, of course, for the debuggers, the leading one of whom headlines his ads, *"Blitzkrieg on Bugs."*

Prefix Trouble

• • • *We took with a grain of salt the story about the childless Frenchman who said his wife was inconceivable, but a letter has just come in from the New York office of the French Commercial Attache, telling us to take the name of an individual off the address stencil and hereafter to address copies impersonally.*

Puzzles

We gave $416.70 as the answer to the Feb. 13 problem. That's wrong. The coal company was out $216.70. Sorry.

So far we have had one answer to Major Stiles' football problem. One of the more highly cerebrated members of the brains department arrived at this solution in five minutes: *Tufts, blue, Albie; Trinity, red, Barry; Tulane, brown, Bill; Temple, purple, Ben. Tufts vs. Trinity. Tufts wins. Tulane vs. Temple, Temple wins 12-0. Play-off, Tufts 6, Temple 3.*

A 90-second solution to this will get you an "A" on your report card:

A 3-in. cube, painted black, is sawed into 1-in. cubes. How many cubes are painted on three sides, two sides, and so on?

News of Industry

Photo by Wide World

FLYING JEEP: This new plane, being tested in Georgia, as a courier for motorized divisions, is reported to be able to take off and land at 25 mph.

Week-end Blackout Ending in U. S. Plants

Washington

• • • **The week-end blackout** which has been the source of concern on the part of defense officials has been considerably diminished according to a survey made by the Bureau of Labor Statistics, Department of Labor, which has reported that almost one-half of 394 large establishments in 11 key industries are now operating at least six days a week, and overtime has become widespread.

In the machine tool industry on which tremendous pressure has been brought to increase output, the report said that extensive use of overtime has resulted in many of the plants running close to 24 hr. daily as compared with two shift schedules.

In the machine tool and machine tool accessories industries most of the plants surveyed were operating either 5½ or 6 days. In most of the other industries 6-day operating schedules were predominant with the exception of the smelting and refining industry where practically all of the plants were in continuous operation.

The survey also covered shipbuilding, electrical machinery, apparatus and supplies, brass, bronze and copper products, aluminum manufactures, explosives, engines (other than aircraft) firearms and ammunition.

The survey was conducted at the request of the Advisory Commission to the Council of National Defense and covered schedules, days per week plants were operated and the extent of overtime. The largest plants in each of the industries were included in the study and the wage earners employed in these plants comprised more than half of the estimated total number in the 11 industries. The plants included averaged well over 1000 wage earners each.

Approximately 280,000 wage earners in the reporting establishments worked a total of more than 2,500,000 hr. overtime during the mid-week of December, 1940. The amount of overtime put in by the average worker who worked overtime was more than 11 hr. in shipbuilding and machine tools, between 10 and 11 in machine tool accessories and engines; from six to nine in brass, bronze and copper products, aluminum manufactures, and electrical machinery, apparatus and supplies and slightly less than five in smelting and refining.

The report said that more plants were operating five days during the surveyed week than on any other schedule, 142 plants reporting five-day operations, and 68 others reporting 5½ days per week. On the other hand, 116 plants were on a full six-day schedule, and 68 plants reported seven-day operation. In the electrical machinery industry more than half of the plants were operating five days per week. In the shipbuilding industry, 19 of the 34 yards covered were operating five days during the week, and seven of the 18 engine manufacturing plants (not including aircraft engines) were on a five-day schedule.

SELF-SEALING PLANE TANKS: Employees at the B. F. Goodrich Co. plant in Akron, Ohio, are shown here working on fuel tanks for combat planes. Rubber linings and coverings make possible the rapid sealing of holes caused by machine gun fire. (Self-sealing tanks are not new; they were used in the World War.)

Photo by Wide World

Armco Will Build New Blast Furnace

• • • **Construction of a** new $5,000,000 blast furnace with a daily capacity of 1000 tons of pig iron at the Ashland, Ky., plant of the American Rolling Mill Co. is announced by Charles R. Hook, president.

Much of the pig iron output will be available for defense purposes, while the remainder of the metal will be used at the company's Butler, Pa., plant. Work on the new furnace, which will be one of the largest in the industry, will start soon, and is expected to be completed in one year. A railroad storage yard capable of holding 200 cars, and a 400,000-ton ore storage equipped with ore bridge and car-dumping equipment is included in the construction. No coke ovens are contemplated at present, as the company will continue to purchase coke from outside sources already established.

Operation of two other blast furnaces operated by Armco at Ashland in conjunction with its open hearths and continuous rolling mill will be continued.

Coming Events

Feb. 27 to 28—American Hot Dip Galvanizers Association, annual meeting, Pittsburgh.

March 3 to 7—American Society for Testing Materials, spring meeting, Washington, D. C.

March 13 to 14—Society of Automotive Engineers, national aeronautic meeting, Washington, D. C.

March 25 to 29—American Society of Tool Engineers, Machine and Tool Progress Exhibit, Detroit.

April 16 to 18—Electrochemical Society, Inc., spring meeting, Cleveland.

April 23 to 25—Concrete Reinforcing Steel Institute, annual meeting, Hot Springs, Va.

May 5 to 7—American Gear Manufacturers Association, annual convention, Hot Springs, Va.

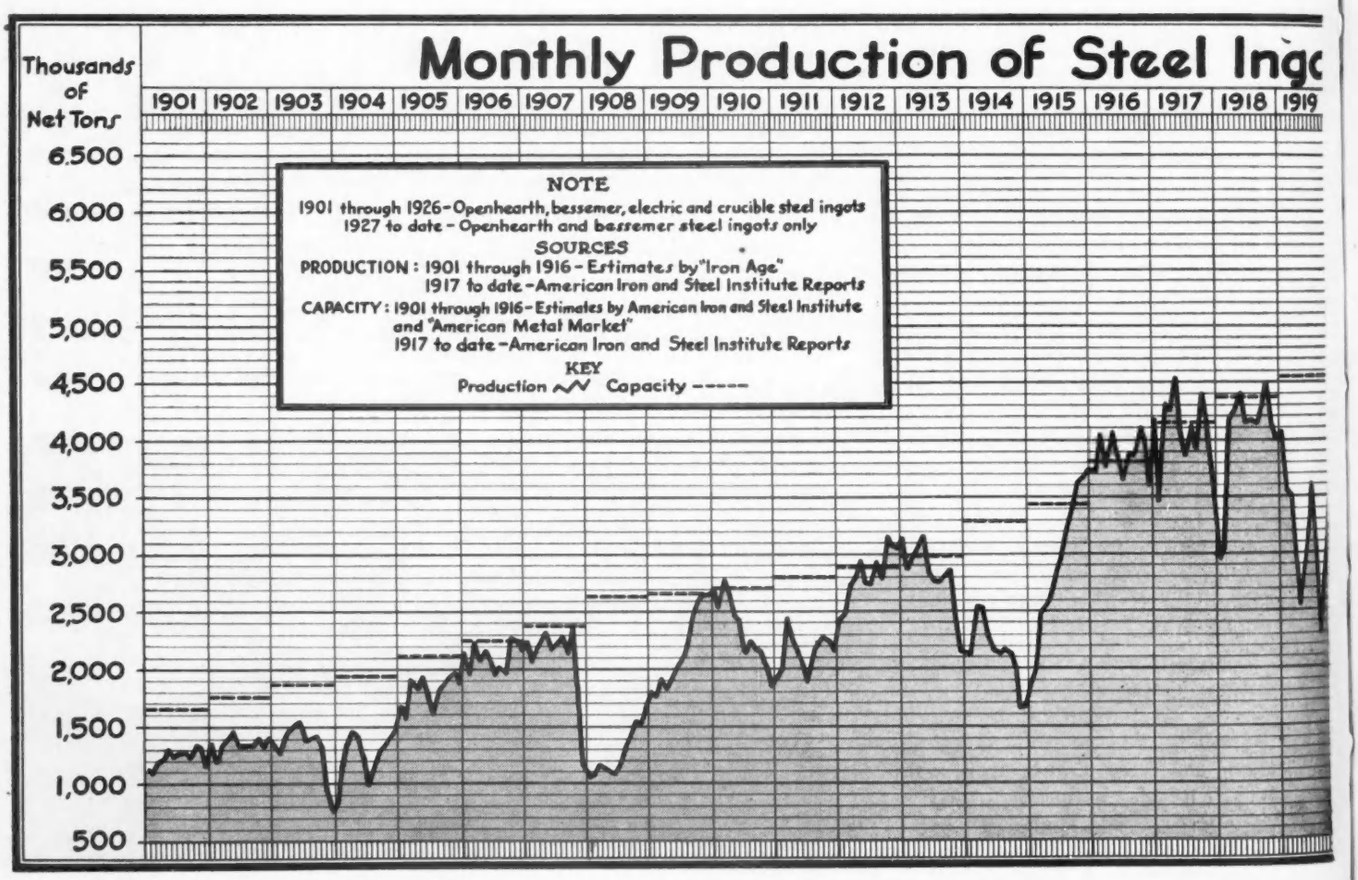
Michigan Leads in Gray Iron, Semi-Steel Castings

Washington

• • • **Leading other states,** Michigan produced 1,114,240 net tons or practically 20 per cent of the 1939 output of 5,487,905 tons of gray iron and semi-steel castings, according to the Bureau of Census. The report supplements one on malleable iron castings issued Nov. 12, and another on gray iron and semi-steel castings issued Nov. 13, last year.

Of the 1939 Michigan production of gray iron and semi-steel castings, 275,261 tons was made and consumed in the same plant and 838,979 tons, valued at $78,873,187, was made for sale and for intraplant transfer. The 1937 Michigan output was 1,112,711 tons of which 1,021,804 tons, valued at $98,101,745, was made for sale and for intraplant transfer.

The United States production in 1937 totaled 6,652,257 tons of which 4,776,389 tons was merchant or intraplant material, val-



ued at $362,756,026. The material for sale or intraplant transfer produced last year totaled 4,006,583 tons, valued at $301,051,791.

Pennsylvania was the next largest producer last year with an output of 972,716 tons, compared with 1,148,468 tons in 1937 when the Keystone State took the first rank by a slight margin over Michigan. Illinois rated third last year with 783,598 tons against 1,013,197 tons in 1937, followed by Ohio with respective outputs of 696,572 and 769,764 tons.

20th Century Fund Staff Now Sees Labor Shortage

• • • **Recent major** increases in America's defense program will bring about a demand for labor that "will exceed the number of unemployed persons," the research staff of The Twentieth Century Fund reports. Previously the staff had estimated that under the original sixteen billion dollar defense program, present reserves of labor were adequate.

Industrial Truck Orders Off in January

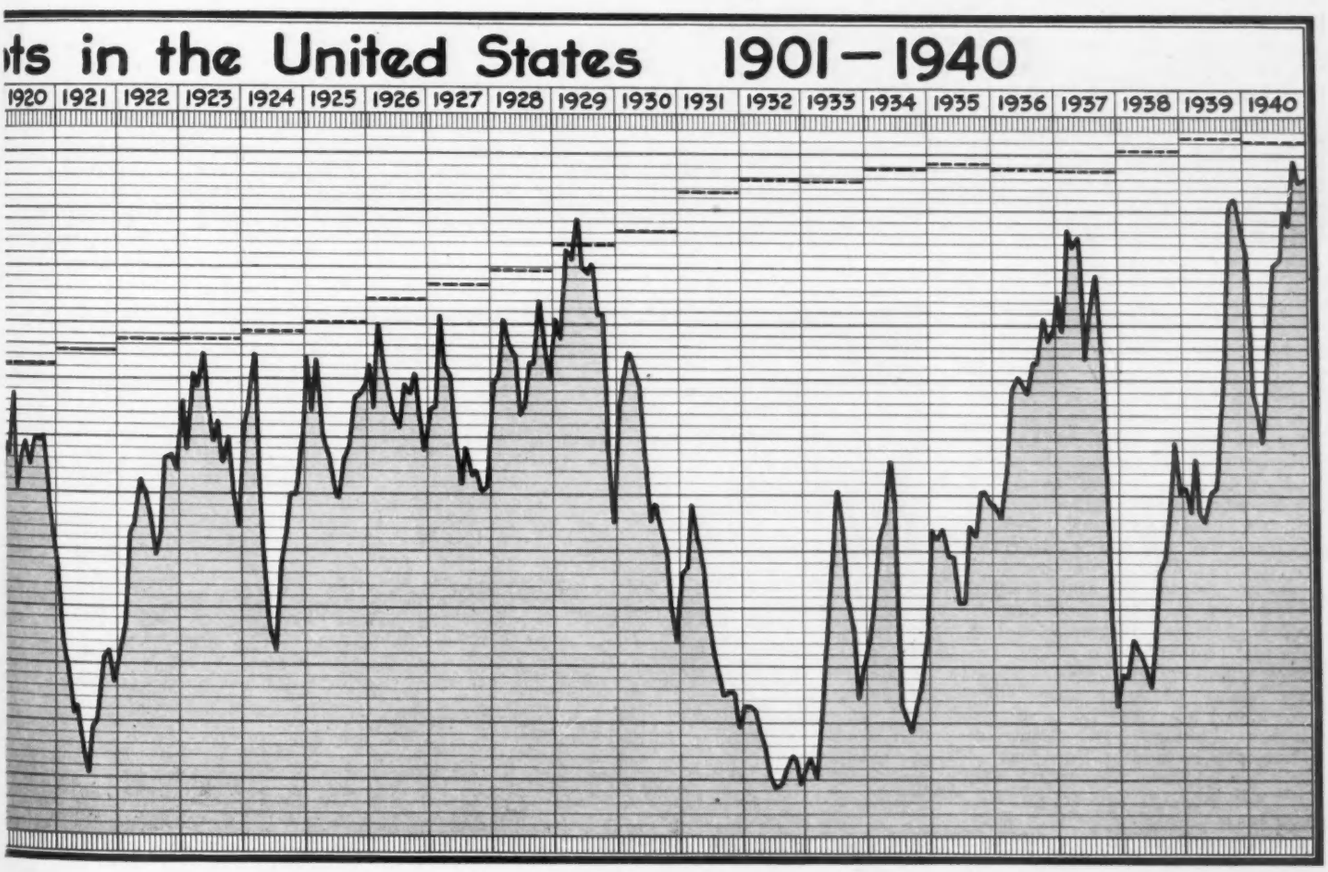
• • • **January bookings** of electric industrial trucks and tractors dropped somewhat from the peak reached in December of last year. Figures just released by the Industrial Truck Statistical Association, 218 South LaSalle Street, Chicago, reveal that 261 units were booked during January, an increase of 222 per cent over the same month of last year.

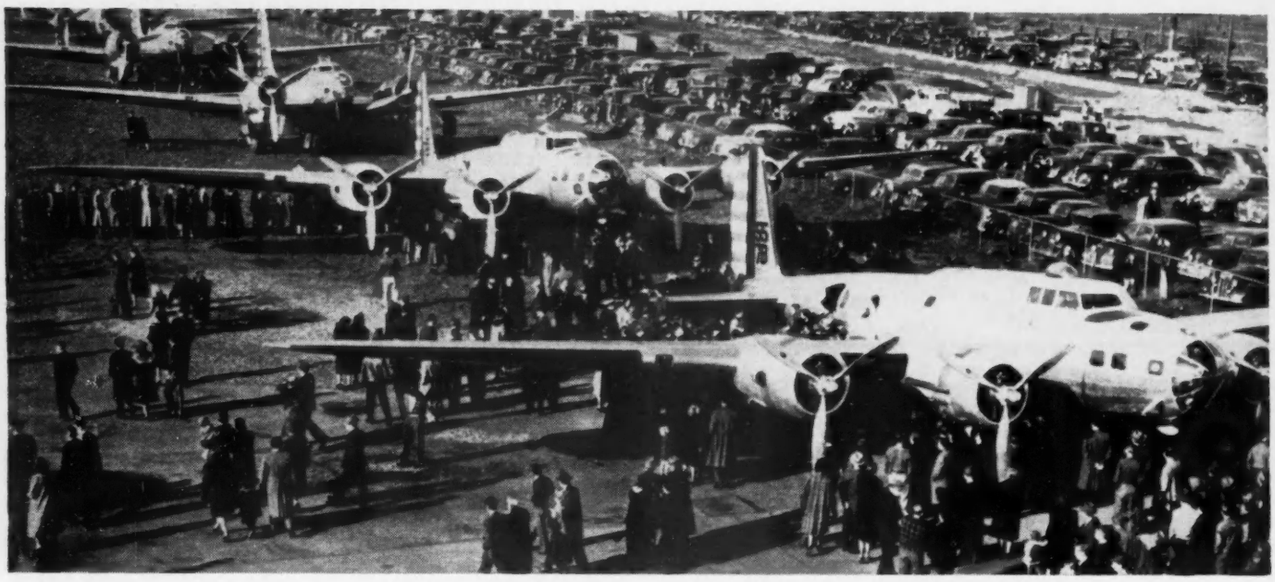
Total net value of chasses only booked was $889,440.50, an increase of 228 per cent over the value of bookings last January.

Fourteen non-elevating platform trucks, with capacities and base chasses prices ranging from 2000 to 6000 lb. and $1250 to $1980 respectively, had a total net value of $25,560. All net values shown are at factories, after additions and deductions for variations from standard specifications, trade in allowance, etc., when applicable. There were also 218 cantilever trucks, with capacities and base chasses prices ranging from 1000 to 25,000 lb. and $1200 to $13,865 respectively, with a total net value of $757,548.50; 13 tractors, with capacities and base chasses prices ranging from 600-1200 lb. to 2500 lb. draw bar pull and $1395 to $1960 respectively, had a total net value of $20,980; seven crane trucks with capacities and base chasses prices ranging from 2500 lb. at 7 ft. to 10,000 lb. at 5½ ft. radius and $5000 to $7450 respectively, had a total net value of $39,567; nine special trucks, scoop shovel, sheet and paper handlers, with capacities and chasses base prices ranging from 2000 to 20,000 lb. and $3885 to $6315 respectively, had a total net value of $45,785.

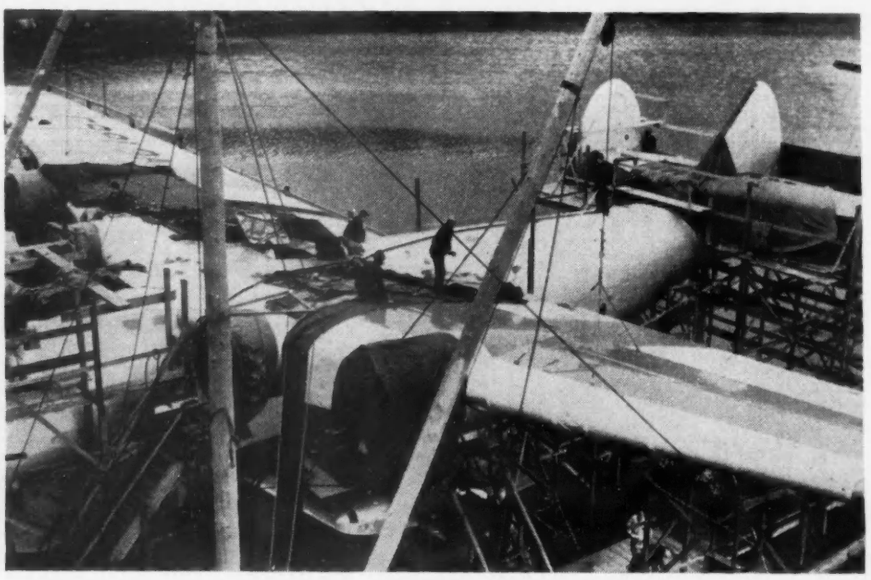
Oliver Iron Mining Co. Appoints Newspaperman

• • • **LeRoy Salsich,** president, Oliver Iron Mining Co., subsidiary of United States Steel Corp., announces appointment of Joseph H. Jordan, until recently publisher of the Duluth *Herald* and Duluth *News-Tribune,* as director of public relations of the company.



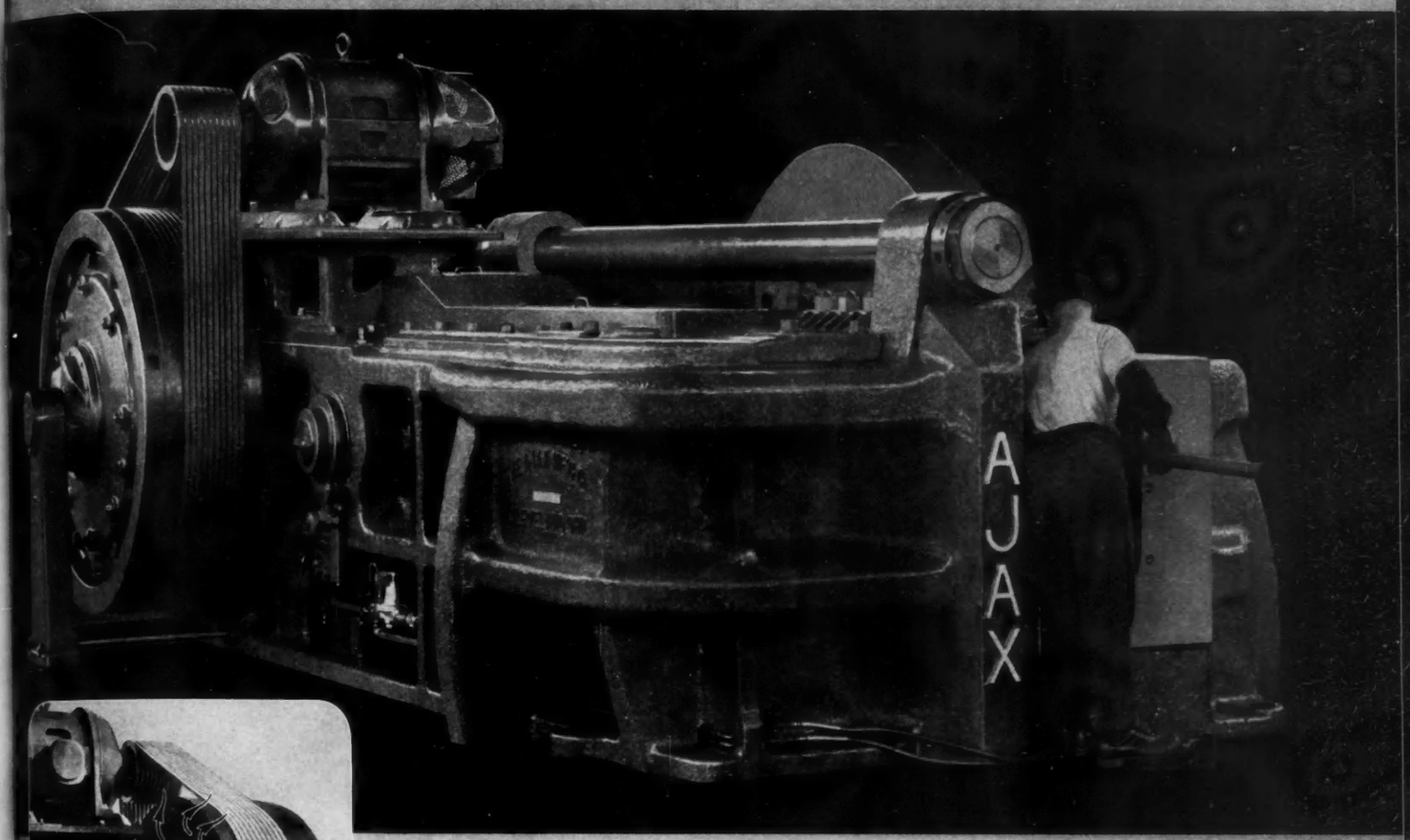


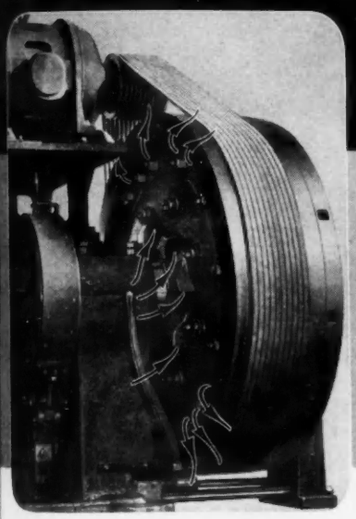
Photos by International and Wide World



ROLLING OUT THE PLANES: Hudson bombers (top) for the British are being turned out so fast at Lockheed Aircraft Corp.'s Burbank, Cal., plant, that finishing touches to final assembly work are put on outdoors. The 42-ton Boeing clipper (below) is pictured nearing completion at Seattle, Wash. Ten thousand Boeing employees and friends are shown (center) inspecting 4-motored "flying fortresses." The Boeing clippers have a fuel capacity of 5400 gal., and a cruising range of more than 4000 miles. They are powered by Wright Cyclone 14's. Some of them may be sold by Pan American Airways, for whom they are being built, to Great Britain for use in maintaining British Empire communications.

BUY FORGING EQUIPMENT ON THE BASIS OF MECHANICAL SOUNDNESS





Double Draft Ventilated AJAX Air Clutch Assures SPEEDIER PRODUCTION of Upset Forgings on AJAX Forging Machines

♦ On certain multi-operation forging jobs, increases up to 25% over previous outputs are being attained on Ajax Air Clutch Forging Machines due to the instantaneous response of the air clutch to effortless tripping and smooth, cushioned starting at high operating speeds. The output of certain classes of work on Ajax Forging Machines, operated by this direct acting air clutch, is limited principally by what is consistent with reasonable tool life.

The Ajax Double Draft Ventilated Air Clutch engages at any point in its cycle, enabling the operator, when handling work which can be transferred rapidly, to unclutch the machine and re-engage it for the next pass before the machine has come to a complete stop, without sacrifice of safety. With operation so sensitively controlled by the air clutch, the operating cycle of Ajax Air Clutch Forging Machine is automatically adjusted to the operator's natural working rhythm, resulting in increased production with less exertion on the part of the operator. Being double draft ventilated from hub to rim on both sides of the fly wheel, ample cooling is provided throughout the clutch so that excessive heating is prevented, even under highest frequency of engagement.

When buying upset forging equipment, buy it on the basis of mechanical soundness and realize in full the speedier and lower-cost production of upset forgings on Ajax Air Clutch Forging Machines. Write for Bulletin 65A.

UPSET FORGING Offers Substantial Savings In Steel, Machining, Freight.

THE AJAX MANUFACTURING COMPANY

621 MARQUETTE BLDG. CHICAGO, ILLINOIS

EUCLID BRANCH P.O. CLEVELAND, OHIO

201 DEWART BUILDING NEW LONDON, CONN.

WAR ON WHEELS: Pictures like this could not have been taken in the U. S. before 1941. Here are motor vehicles, tanks, trucks and scout cars (2000 in all) lined up at Fort Benning, Ga. This is the Army's Second Armored Division, containing 10,000 men.

Photo by International

Martin Plant Plans to Triple Facilities

• • • **Disclosing** that his firm would "be producing $36,000,000 worth of airplanes a month by June, 1942," Glenn L. Martin reports a program to triple the facilities of his plant which, he said, "is now 40 per cent completed." The Martin plant, he said, will be "the largest airplane manufacturing concern in the United States." Last month the Martin company produced $6,200,000 worth of airplanes at its Baltimore plant.

The company eventually will operate three large factories, two at Middle River, Baltimore, and one at Omaha, Neb.

Welding Society to Hold District Exhibit at Newark

• • • **The Northern New Jersey** section of the American Welding Society is sponsoring a manufacturers' exhibit to be held in the Terrace room of the Mosque Theater, 1020 Broad Street, Newark, N. J., Friday and Saturday, March 21 and 22. F. C. Fyke of the Standard Oil Development Co. is chairman of the committee on exhibits.

OUTPERFORMED
and the 2nd and 3rd
SLITTING LINES
were soon installed

Yes, this No. 700 high production steel mill type slitting line is distinctive. It is refined and advanced in several essential details and particularly outstanding in one very important factor.

The YODER *Patented* Removable Cutter Sleeves permit quick set-up for different cutting widths *away from the machine.* The slitter continues to produce and the change over is made very quickly with a new "low" in non-productive time.

This slitting line has capacity for 1/16" to 3/16" by 40" wide soft cold rolled steel or hot rolled stainless steel in coils up to 10000 pounds.

Speeds, depending upon gauge and width, from 150 to 250 feet per minute are obtained. As many as 9 cuts may be made in 3/16" gauge 1.00 carbon steel at 150 feet per minute and a greater number of cuts in lighter gauges at higher speeds may be obtained

The line consists of a driven roll uncoil box, seven roll leveler, slitting shear with cutters mounted on sleeves, scrap chopper and heavy tension reel. Tandem operation is secured with variable voltage and field control from a central station.

Investigate this slitting line and discover the outstanding performance that prompted one mill to install a second and third line soon after the first one was put into operation.

YODER ALSO MAKES

Roll Forming Machines
Beading Machines
Bending Machines
Brake Shoe Machines
Cut-off Machines
Tension Reels
Coilers
Uncoilers
Scrap Cutters
Power Hammers
Complete Pipe Mills
Special Machinery

WRITE FOR LITERATURE
OR AN ESTIMATE ON
MACHINERY
BUILT TO YOUR SPECIFICATIONS

YODER builds a complete line of slitting equipment for mills, warehouses and job shops for all gauges and widths using slip clutch recoiling and pull slitting or other types of electrical control.

THE YODER COMPANY

5500 WALWORTH AVENUE
CLEVELAND, OHIO

"Certificate of Necessity" Forms Are Simplified

Washington

• • • **Speedier handling** of requests for Certificates of Necessity for plant expansion is expected as a result of simplification in application forms, the National Defense Advisory Commission has announced.

Revision of the forms was made necessary by adoption of a law by the present Congress, amending Section 124 of the Internal Revenue code, which made it possible to file applications for the certificates within 60 days after acquisition or beginning construction on a new plant. Formerly, it was necessary to obtain a certificate before construction could be begun or new facilities acquired or constructed.

Simplification of tables to be filled in by the applicant, and clarification of some of the questions asked, are expected to enable the commission to act with greater speed upon new applications for certificates. Applicants are urged to give complete information in order to facilitate a decision by the commission.

An important addition to the questionnaire is the request: "If adequate productive capacity exists in this country for the products to be produced by the applicant, a particularly full explanation of need for new facilities should be given."

One purpose of this request is to make certain that all available productive facilities within an industry are being used, so that orders may be spread effectively. Another purpose is to avoid overtaxing the facilities of an industry for a short period, and make it possible to spread orders over a longer period, unless emergency need is very great.

The new form of application for a Government Protection Certificate and for the non-reimbursement certificate also have been altered to conform with changes in the law. In each instance application must now be filed before the expiration of 60 days after making of a contract with the United States. Before the new act these certificates, to be effective, had to be issued within 90 days after making of a contract.

The new forms supersede instructions issued on Nov. 1, 1940. Copies may be obtained at the Office of the Assistant Secretary of War or the Office of the Judge Advocate General of the Navy, Certification Unit.

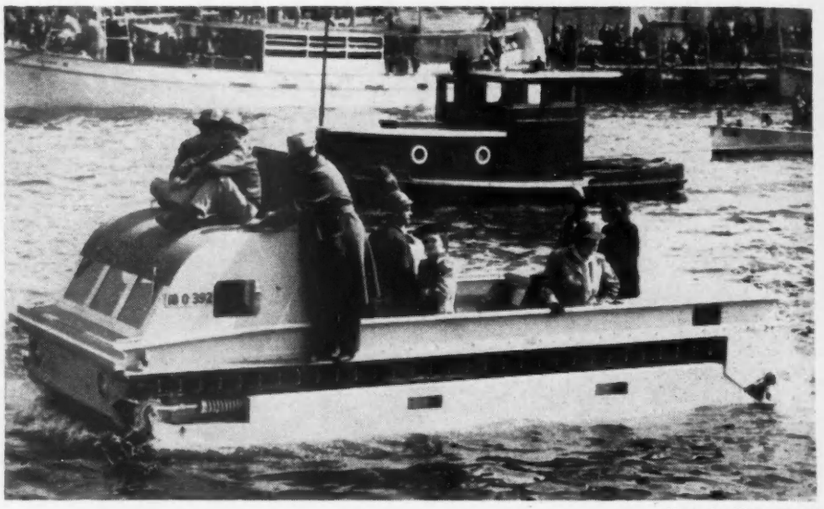


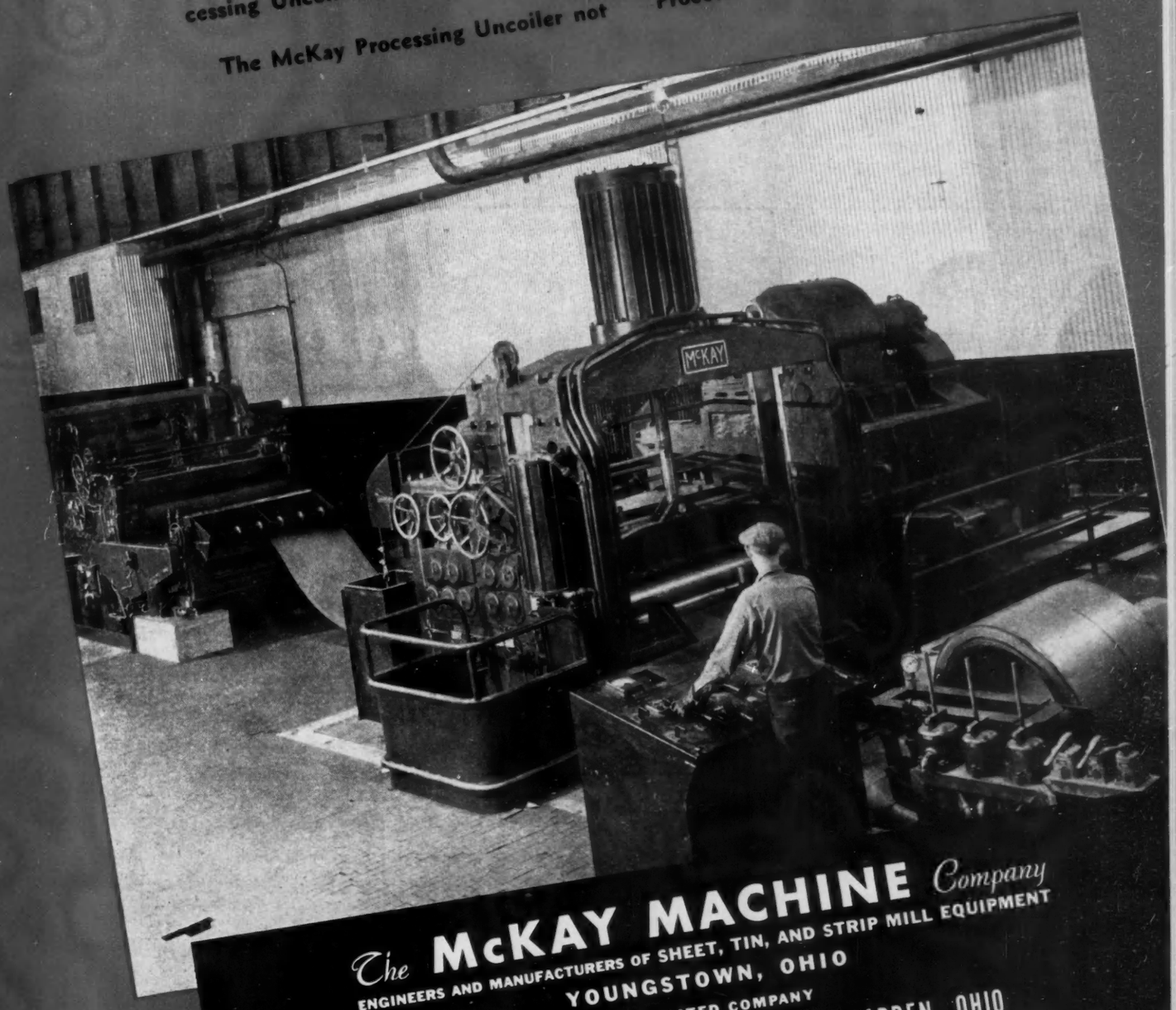
Photo by Wide World

DONALD ROEBLING, Clearwater, Fla., has just been awarded a Navy Department order for amphibian tractors valued at $3,240,000. Above is a picture of a Roebling amphibian tank preparing to crawl up on the shore at Tampa, Fla. It is equipped with propellor and tractor cleats.

McKAY
PROCESSING UNCOILER

To produce a surface free from objectionable coil breaks when uncoiling hot rolled strip—use the McKay Processing Uncoiler.

The McKay Processing Uncoiler not only increases pickling line speed, but lowers the operating cost of coil handling. Production figures prove that greater tonnage results where McKay Processing Uncoilers are used.



The **McKAY MACHINE** *Company*

ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT

YOUNGSTOWN, OHIO

ASSOCIATED COMPANY

The WEAN ENGINEERING CO., Inc. • WARREN, OHIO

Government Awards

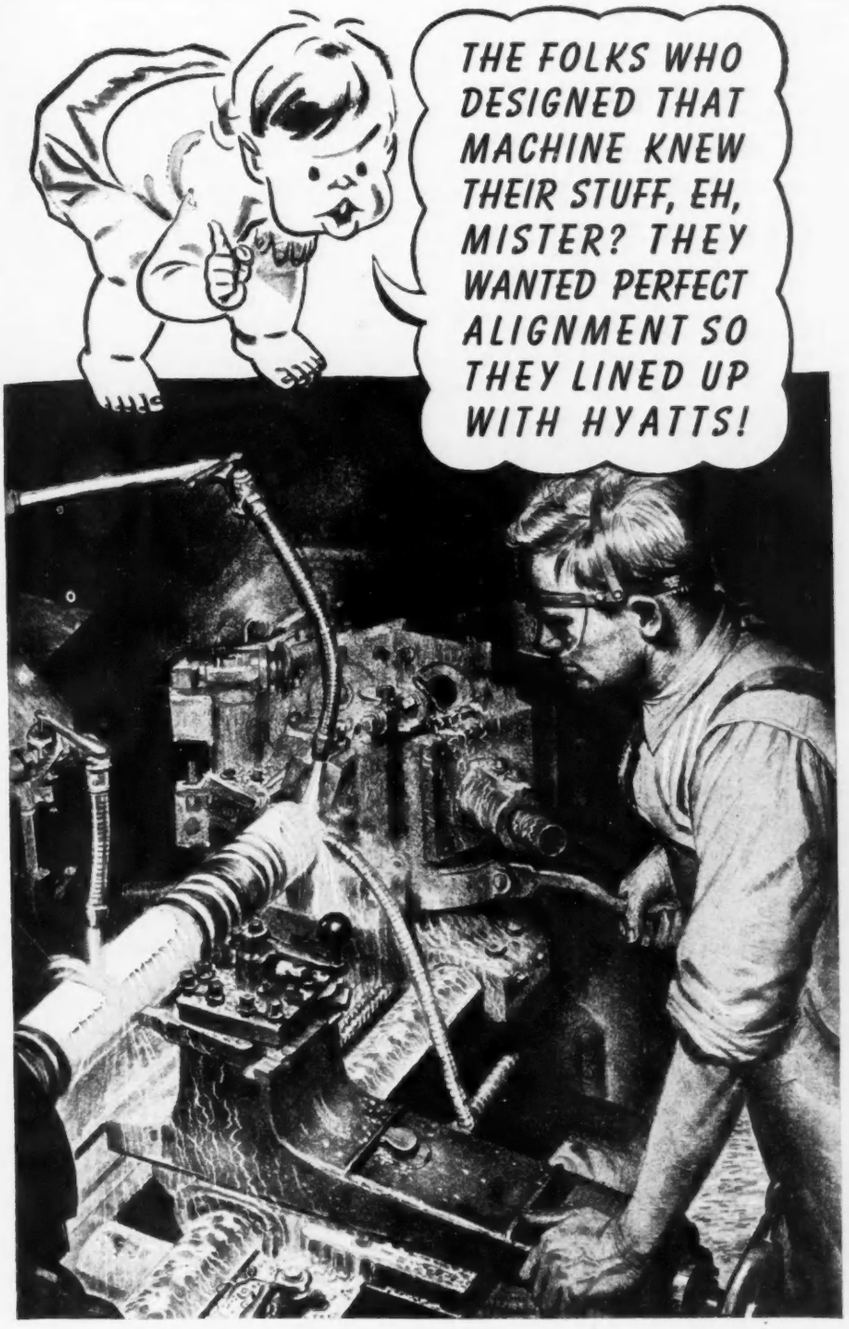
Government awards during the week ended Feb. 15, 1941, as listed by the Public Contracts Division, Department of Labor, follow:

Iron and Steel Products...$13,614,291

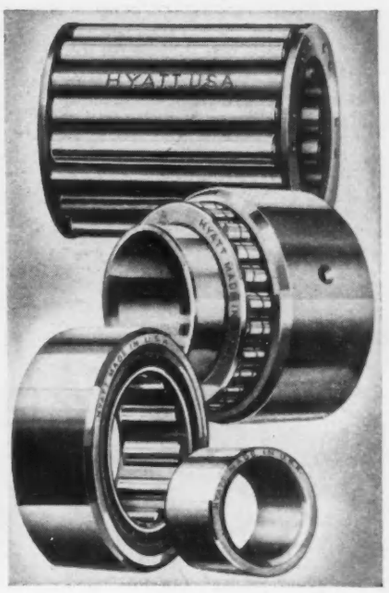
Allis-Chalmers Mfg. Co., Milwaukee; shafts $23,052
Aluminum Co. of America, Pittsburgh; rivets and nuts 18,896
American Bridge Co., Denver, Colo.; gates 65,567
American Car & Foundry Co., New York; plug cocks 25,299
American Chain & Cable Co., Inc., San Francisco; wire rope 13,908
American Chain & Cable Co., Inc., American Cable Division, Wilkes-Barre, Pa.; cable 30,294
American Locomotive Co., Schenectady; forgings 78,050
American Stove Co., Cleveland; ranges 74,937
Barnes Mfg. Co., Mansfield, Ohio; pipe flanges 23,850
Beall Pipe & Tank Corp., Portland, Ore.; tanks 16,950
Bethlehem Steel Export Corp., New York; plate steel 24,417
Bethlehem Steel Co., Los Angeles, Cal.; steel bars 23,103
Boston & Lockport Block Co., East Boston; steel blocks 10,908
L. S. Brach Mfg. Corp., Newark, N. J.; junction box 39,960
Carter Waters Corp., Kansas City; wire mesh 13,790
Chicago Bridge & Iron Co., Birmingham, Ala.; tanks 17,000
Collins Co., Washington; machete in sheath 12,850
Commercial Shearing & Stamping Co., Youngstown; super structure hoists 75,375
Consolidated Supply Co., Portland, Ore.; iron pipe 61,340
Crane Co., San Francisco, Cal.; flanges 12,244
Crucible Steel Co. of America, New York; steel sheet 16,390
Detroit, Mich., Stove Co., Detroit; ranges 32,512
Dulien Steel Products, Inc., of Cal., Treasure Island, Cal.; valves, tees 38,994
Duro Metal Products Co., Chicago; extension and wrenches 23,846
Edison General Electric Appliance Co., Inc., Chicago; fryers 74,972
Electric Auto-Lite Co., Toledo, Ohio; booster, fuse parts 1,917,006
Erie Forge Co., Erie, Pa.; shafts. 23,185
Eureka Vacuum Cleaner Co., Detroit; eyerings 29,311
Fisher Boat Works, Inc., Detroit; hull and fittings 257,000

DEFENSE EXPEDITER: W. Averell Harriman (above) will leave shortly for London as President Roosevelt's "defense expediter" to handle work in the U. S.-British lease-lend program.

Garland Mfg. Co., Saco, Me.; rawhide hammer 12,800
Griswold Mfg. Co., Erie, Pa.; deep fat fryers 79,680
C. Hager & Sons Hinge Mfg. Co., St. Louis; hinges 66,171
Harrisburg Steel Corp., Harrisburg, Pa.; air system separators 21,300
Harvard Lock Co. of New York, Inc., New York; mounting 20,120
Independent Lock Co., Fitchburg, Mass.; fuse parts 965,000
International-Stacey Corp., Columbus, Ohio; steel buildings 169,480
searchlight towers 12,892
Isaacson Iron Works, Seattle, Wash.; structural steel 20,130
Jessop Steel Co., Washington, Pa.; bars, steel 25,009
Karp Metal Products Co., Inc., Brooklyn; box 79,814
Mathias Klein & Sons, Chicago; pliers 15,000
Kraeuter & Co., Inc., Newark, N. J.; pliers 25,780
H. A. Kuljian & Co., Philadelphia; boiler and accessories 145,723
Lukens Steel Co., Coatesville, Pa.; steel plates 27,714
Majestic Mfg. Co., St. Louis; ranges 52,150
Mills-Morris Co., Washington; saws, clamps 48,139
cutters 29,982
M. Mocoroa Arzuaga, Inc., San Juan, P. R.; pipes and valves .. 12,994
Charles Mundt & Sons, Jersey City, N. J.; brass 15,592
National Machine Products Co., Detroit; nuts 51,391
National Stamping Co., Detroit; angletubes 114,975
National Tube Co., Washington; flasks 75,862
steel tubing 27,392
Norwalk Tank Co., Inc., South Norwalk, Conn.; tanks 25,678
Pick Mfg. Co., West Bend, Wis.; target frame 163,370
Pittsburgh Forgings Co., Coraopolis, Pa.; forgings 19,793
Republic Steel Corp., Chicago; nickel steel 241,455



A bearing for every application! Shown below: Hyatt Junior Solid Roller type, Hyatt Wound Roller type, and Hyatt Hy-Load type.



KEEP THEM YOUNG WITH HYATTS whether they be machine tools, cranes, hoists, trucks, or any other mechanical equipment you build or buy. Remember, always, that the best way to keep bearing wear and care *out* is to put Hyatts *in!* Hyatt Bearings Division, General Motors Sales Corporation, Harrison, New Jersey; Chicago, Pittsburgh, Detroit and San Francisco.

HYATT

ROLLER BEARINGS

QUIET

Republic Steel Corp., Union Drawn Steel Division, Massillon, Ohio; steel 21,786
Revere Copper & Brass Co., Inc., Baltimore Division, Baltimore; bullet jacket cups 789,770
Rice Brothers Corp., East Boothbay, Me.; hull and fittings 272,800
Scovill Mfg. Co., Waterbury, Conn.; cases, fuses, boosters 6,007,530
William Scrimgeour, Washington; dishwashing baskets 14,730
Standard Gas Equipment Corp., Baltimore; brass 15,592
Steel Improvement & Forge Co., Cleveland; forgings 59,885
Storms Drop Forging Co., Springfield, Mass.; forgings 28,802
Uchtorff Co., Davenport, Iowa; chests 77,264
A. J. Ulmer, New York; cases .. 23,050
snap, stake 19,526
Union Steel Chest Corp., LeRoy, N. Y.; tool boxes 32,760
United States Steel Export Co., Washington; structural steel .. 11,984
Utica Drop Forge & Tool Corp., Utica, N. Y.; nippers and pliers 128,519
Veit & Young, Philadelphia; stems, dies 16,707
Weaver Mfg. Co., Springfield, Ill.; towing bars 29,625
S. Weinstein Supply Co., New York; hinges 11,118
Wells Mfg. Co., San Francisco, Cal.; fryers 18,615
White Motor Co., Cleveland; cable kits 17,670
J. H. Williams & Co., Buffalo; forgings 17,850
Woodings-Verona Tool Works, Verona, Pa.; crow bars 10,528

Nonferrous Metals & Alloys ..$479,580

Aluminum Co. of America, Washington; aluminum tanks $19,682
American Smelting & Refining Co., New York; lead pig 11,000
copper 67,972
Calumet & Hecla Consolidated Copper Co., New York; copper, ingot 54,225
Diecasters, Inc., Ridgefield, N. J.; die castings 11,894
Doehler Die Casting Co., Toledo, Ohio; nozzles 41,595
International Nickel Co., Inc., New York; nickel-copper alloy. 30,666
Mueller Brass Co., Port Huron, Mich.; brass forgings 95,268
West Bend Aluminum Co., West Bend, Wis.; pitchers 13,200

Other Machinery $6,260,916

Air Reduction Sales Co., New York; oxy-acetylene machines.. $18,458
Allis-Chalmers Mfg. Co., Milwaukee; pumps 10,444
American Bosch Corp., Springfield, Mass.; engine parts 167,113
American Machine & Metals, Inc., East Moline, Ill.; washing machines 26,887
Ames Baldwin Wyoming Co., Parkersburgh, W. Va.; shovel 36,170
Austin-Hastings Co., Inc., Cambridge, Mass.; shapers 125,850
Bay City Shovels, Inc., Bay City, Mich.; crane 25,900
Bird Machine Co., South Walpole, Mass.; centrifugal classifier ... 11,174
E. W. Bliss Co., Brooklyn; presses 16,435
Browne & Sharpe Mfg. Co., Providence; grinders 13,083
Buda Co., Harvey, Ill.; engine parts 10,951
Bullard Co., Bridgeport, Conn.; turret lathes 26,288
Busch Sulzer Bros. Diesel Engine Co., St. Louis, Mo.; cylinders.. 18,706
Case Crane & Kilbourne Jacobs Co., Columbus, Ohio; hand trucks 10,155
Caterpillar Tractor Co., Peoria, Ill.; graders 153,150
Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati; milling mach. 10,390
Cleveland Tractor Co., Cleveland; tractors 22,364
Continental Motors Corp., Muskegon, Mich.; chargers 70,960
Cooper-Bessemer Corp., Mount Vernon, Ohio; air compressor 88,682
DeVilbiss Co., Toledo, Ohio; compressors and respirators 194,447
Dockson Corp., Detroit; welding and cutting equipment 10,873
Eagle Crusher Co., Inc., Galion, Ohio; rock crushers 12,638
Earle Hart Woodworking Machine Co., Chicago; mortiser 24,640
John Edwards, Inc., Brooklyn; generator pts. 19,876
Ex-Cell-O Corp., Detroit; pumps. 10,444
Fairbanks, Morse & Co., Boston; pumps, engines, gear units 16,890
pumping units 12,426
Frick Co., Inc., Waynesboro, Pa.; refrigerating equipment 16,149
Fruehauf Trailer Co., Detroit; trailers, dollies 556,950
Galion Iron Works & Mfg. Co., Galion, Ohio; road rollers 161,800
Gardner-Denver Co., Washington; compressors 193,512

Gen. Motors Corp., Harrison Radiator Div., Lockport, N. Y.; oil coolers, engines 12,381
Gisholt Machine Co., Madison, Wis.; lathes 47,600
Globe Industries, Inc., Dayton, Ohio; turntable assys. 45,105
C. H. Gosiger Mach. Co., Dayton, Ohio; wood working equipment 24,150
M. Greenberg's Sons, San Francisco; valves, globes 16,284
Gould & Eberhardt, Newark; hobbing mach. 13,004
shapers 65,811
Harnischfeger Corp., Milwaukee; bridge cranes 317,780
Heald Machine Co., Worcester, Mass.; grinders 74,126
S. Heller Elevator Co., Milwaukee; elevators 37,375
Hendey Machine Co., Torrington, Conn.; lathes 11,848
Ingersoll-Rand Co., New York; starting units 11,863
International Engineering, Inc., Dayton, Ohio; cooling units ... 74,880
Jones & Lamson Machine Co., Springfield, Vt.; thread grinding machine 17,086
Kearney & Trecker Corp., Milwaukee; milling machines 118,101
Lloyd & Arms, Inc., Philadelphia; honing machs. 59,263
drills 12,293
Machinery & Specialties, Inc., Dayton, Ohio; wood working equipment 22,800
Malabar Machine Co., Huntington Park, Cal.; jacks 17,618
Modern-Bond Corp., Wilmington, Del.; slides and blocks 12,330
Moore Machinery Co., San Francisco; boring, drilling machine. 15,636
National Supply Co., Pittsburgh; engines 21,366
Niagara Machine & Tool Works, Buffalo; shearing machs. 17,748
George P. Nichols & Brother, Inc., Chicago; transfer, table 14,710
Ohio Locomotive Crane Co., Bucyrus, Ohio; crane 19,233
D. W. Onan & Sons, Minneapolis; gasoline generator 15,170
Orton Crane & Shovel Co., Chicago; locomotive cranes 89,455
Osborne & Sexton Mach. Co., Columbus, Ohio; wood working equipment 14,886
Pacific Marine Supply Co., Seattle; pumps 24,148
Pratt & Whitney, Niles-Bement-Pond Co., West Hartford; drilling machs. 49,160
Precise Tool & Mfg. Co., Farmington, Mich.; pin gages 36,531
Pump Engineering Service Corp., Cleveland; gear drive 30,725
Hugh G. Purcell, Seattle; cast iron pipe 15,187
Rex Body Corp., Canastota, N. Y.; shackle, assy. 14,821
Rockford Machine Tool Co., Rockford, Ill.; slotter machs. 18,328
shapers 39,354
Rogers Brothers Corp., Albion, Pa.; trailers 36,720
St. Joe Machines, Inc., St. Joseph, Mich.; presses, tumblers. 20,740
Schlosser Mfg. Co., Philadelphia; gages 51,086
Wm. Sellers & Co., Philadelphia; grinding mach. 11,513
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.; wall cranes 138,674
cranes 21,006
W. E. Shipley Machine Co., Philadelphia; grinders 198,956
Sier-Bath Co., Inc., New York; gears and shafts 32,826
Skinner Engine Co., Erie, Pa.; steam engine 74,650
South Bend Lathe Works, South Bend, Ind.; lathes 52,599
Stewart-Warner Corp., Indianapolis; generator assys. 18,400
Stockham Pipe Fittings Co., Birmingham, Ala.; machining shell 571,200
Swind Machinery Co., Philadelphia; drills 71,034
Tidewater Supply Co., Inc., Norfolk, Va.; lathe 32,402
Tinius Olsen Testing Mach. Co., Philadelphia; testing machs. .. 32,775
United States Hoffman Machine Corp., New York; tumblers, extractors 11,877
Variety Aircraft Corp., Dayton, Ohio; stand assys. 198,000
Vulcan Iron Works, Wilkes-Barre, Pa.; locomotive 205,000
Walker Mfg. Co. of Wisconsin, Washington; lifting jack 30,327
Weinman Pump Mfg. Co., Columbus, Ohio; pumps 93,255
Wright Mfg. Div. of American Chain & Cable Co., Inc., York, Pa.; hoists 151,500
Yale & Towne Mfg. Co., Philadelphia; electric trucks 33,062
Yates-American Machine Co., Beloit, Wis.; molder 18,716
York Ice Machinery Corp., Philadelphia; refrigerating units ... 85,932
water chilling equipment 49,028

War Dept., Ordnance:

Allen Electric & Equipment Co., Kalamazoo, Mich.; electrical equipment $1,153

American Brake Shoe & Foundry Co., Chicago; forgings, steel .. 111,600
American Brass Co., Waterbury, Conn.; small arms ammunition. 293,212
brass rod 23,922
brass 1,050,000
American Car & Foundry Co., Berwick, Pa.; castings 2,762
American Manganese Bronze Co, Holmesburg, Philadelphia; bronze 5,499
American Saw Mill Machinery Co., Hackettstown, N. J.; tools 3,500
G. R. Armstrong Co., Boston; tools 1,526
Associated Spring Corp., Wallace Barnes Co. Div., Bristol, Conn.; springs 72,946
Austin-Hastings Co., Inc., Cambridge, Mass.; threader, bolt .. 1,431
Auto Ordnance Corp., Bridgeport, Conn.; small arms materiel ... 2,576,123
Bearings Co. of America, Lancaster, Pa.; bearings 3,792
Bendix - Westinghouse Automotive Air Brake Co., Pittsburgh; parts for brakes 3,996
Bethlehem Steel Co., Bethlehem, Pa.; steel 1,345
Bliss & Laughlin, Inc., Buffalo; steel rod 2,104
Bohn Aluminum & Brass Corp., Detroit; artillery ammunition components 566,950
Brown Instrument Co., Philadelphia; tools 5,285
Buffalo Forge Co., Buffalo; table, drill and vise 1,285
presses, drills 8,731
Carboloy Co., Philadelphia; tools. 2,272
Carnegie-Illinois Steel Co., Gary, Ind.; steel 8,996
Chisholm-Moore Hoist Corp., Tonawanda, N. Y.; hoists 2,107
C. B. Christiansen Co., Newark; punches 3,144
Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati; eliminators 1,260
Cleveland Automatic Machine Co., Cleveland; lathes 4,131
Colt's Patent Fire Arms Mfg. Co., Hartford; components for automatic pistol 9,031
Continental Can Co., Jersey City, N. J.; cans 2,437
Arthur A. Crafts Co., Inc., Boston; gages 4,727
Crucible Steel Co. of America, Pittsburgh; steel 1,304
Coulter & McKenzie Machine Co., Bridgeport, Conn.; units, pickling and washing 9,900
Dana Tool-D Nast Machinery Co., Philadelphia; blades, hack saw. 2,093
Delta Equipment Co., Buffalo; iron workers 6,377
Doehler Die Casting Co., Pottstown, Pa.; artillery ammunition components 7,490
Duro Metal Products Co., Chicago; wrenches 23,826
Exact Weight Scale Co., Columbus, Ohio; scales 6,679
Firth Sterling Steel Co., Philadelphia; steel, tool 1,371
steel 2,355
Fox Munitions Corp., Philadelphia; gages 1,181
General Drop Forge Co., Inc., Buffalo; drop forgings 1,189
General Electric Co., Philadelphia; motors 1,525
Gleason Works, Rochester, N. Y.; machines, surface hardening ... 6,185
Graybar Electric Co., Philadelphia; wire 1,079
Greene-Wolf Co., Inc., Brooklyn; brass 5,305
Grenby Mfg. Co., New Britain, Conn.; grinders 1,928
Griffin Mfg. Co., Erie, Pa.; steel. 1,185
Haarmann Steel Co., Holyoke, Mass.; structural steel 8,662
Hadley Special Tool Co., Inc., Boston; tools 15,767
Louis Hanssen's Sons, Davenport, Iowa; files 1,811
Hendley Machine Co., Torrington, Conn.; lathes 7,541
Honeyman, H. W., & Son, Providence; artillery materiel 4,926
Illinois Coil Spring Co., Chicago; springs 1,774
Independent Pneumatic Tool Co., Chicago; drills, electric 1,317
Ingersoll Milling Machine Co., Rockford, Ill.; cutters, face milling 2,567
Inland Steel Co., Indiana Harbor, Ind.; steel 5,705
International Engineering Works, Inc., Framingham, Mass.; racks 1,500
International Harvester Co., Chicago; tractors 2,113
J. & W. Jolly, Inc., Holyoke, Mass.; half-nuts 1,530
Jones & Lamson Machine Co., Springfield, Vt.; machines, automatic thread grinder 17,086
Jones & Laughlin Steel Corp., Pittsburgh; steel 5,457
Kennedy-Van Saun Mfg. & Engineering Corp., Danville, Pa.; artillery ammunition 819,072
H. R. Krueger & Co., Detroit; machines, drilling 9,537
LaSalle Steel Co., Hammond, Ind.; steel 4,431
Leeds & Northrup Co., Philadelphia; control equipment 1,278
Lewis-Shepard Sales Corp., Moline, Ill.; trucks, lumber 2,400
Logan Co., Louisville, Ky.; sections, conveyor 1,811

Lyon Metal Products, Aurora, Ill.; shelving 3,496
Magnus Tool & Die Co., Newark; gages 1,475
tools 3,600
Metal Goods Corp., St. Louis; brass 7,875
Midvale Co., Nicetown, Philadelphia; steel forgings 7,033
Miller Co., Meriden, Conn.; brass strips 8,550
Mohawk Machine & Tool Co., New York; gages 4,379
Murphy, A. F., Die & Machine Co., Boston; artillery materiel 1,555
New Britain Machine Co., New Britain Gridley Machine Div., New Britain, Conn.; machines, chucking 181,032
Noble & Westbrook Mfg. Co., East Hartford; machine, marking and knurling 8,267
Norton Co., Philadelphia; wheels, grinding 1,266
Norton Co., Worcester; grinders.. 3,043
wheels, grinding 3,724
Oliver Iron & Steel Corp., Pittsburgh; bolts 10,939
Oliver Machinery Co., Grand Rapids, Mich.; sander, saws and planers 3,478
Parent Metal Products, Inc., Philadelphia; benches, work 1,195
tables, drafting 2,275
Pennsylvania Salt Mfg. Co. Wyandotte, Mich.; metal cleaner ... 2,790
Phoenix Mfg. Co., Catasauqua, Pa.; forgings 1,732
Precise Tool & Mfg. Co., Farmington, Mich.; gages 2,930
Reasoner Tool Supply Co., Boston; blades, power hacksaw 5,662
Reliable Tool Co., Inc., Irvington, N. J.; punches and dies 2,965
Remington Arms Co., Bridgeport, Conn.; small arms materiel ... 695,043
Republic Steel Corp., Union Drawn Steel Division, Buffalo; steel .. 21,786
steel bar 2,311
Revere Copper & Brass, Inc., Rome, N. Y.; manganese, bronze and brass, bar 2,239
Ritter Pattern & Castings Co., New York; castings 17,677
Stanley P. Rockwell Co., Inc., Hartford, Conn.; furnaces 10,500
B. M. Root Co., York, Pa.; shapers 2,515
Joseph T. Ryerson & Son, Inc., Chicago; steel 11,331
Scovill Mfg. Co., Waterbury, Conn.; metal parts 193,929
Seamless Products Co., Inc., New York; oil cans 1,836
William Sellers & Co., Philadelphia; machines, grinding 11,513
Sheffield Gage Corp., Dayton, Ohio; gages 16,844
W. E. Shipley Machinery Co., Philadelphia; shapers and lathes 121,419
Sier-Bath Co., Inc., New York; gears 32,826
Specialty Auto Fabrics Corp., c/o Albertson & Co., Sioux City, Iowa; drills 1,103
Starrett Co., Athol, Mass.; calipers 3,642
Sterling Products Co., Inc., Moline, Ill.; bolts 1,079
F. J. Stokes Machine Co., Philadelphia; presses, rotary 11,550
Swind Machinery Co., Philadelphia; lathes 33,240
Taft-Peirce Mfg. Co., Woonsocket, R. I.; gages 13,797
Thomson-Gibb Electric Welding Co., Lynn, Mass.; machines, spot welder 1,874
machines 4,600
Timken Roller Bearing Co., Steel & Tube Division, Canton, Ohio; steel 13,107
Tube Distributors, Inc., Long Island City, N. Y.; seamless steel 3,610
Tube Co., Lorain, Ohio; pipe 7,089
Tubular Service Corp., Pittsburgh; seamless steel 7,974
Union Spring & Mfg. Co., New Kensington, Pa.; springs 6,107
Union Twist Drill Co., Athol, Mass.; end mills 1,067
drills 1,331
hobs 1,886
U. S. Tool Co., Inc., East Orange, N. J.; millers 3,535
Universal Drafting Machine Co., Cleveland; machines, drafting .. 1,300
Vandyck Churchill Co., New York; machine, sawing, hacksaw 1,118
Veit & Young, Philadelphia; tools 8,670
Victor Mfg. & Gasket Co., Chicago; oil retainers 2,020
Vinco Corp., Detroit; gages 20,588
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.; presses, vertical 71,138
West & Dodge Thread Gauge Co., Inc., Boston; gages 1,512
Western Cartridge Co., East Alton, Ill.; small arms ammunition ... 1,165,263
Westinghouse Electric & Mfg. Co., Davenport, Iowa; controls 6,095
Wyckoff Drawn Steel Co., Ambridge, Pa.; steel bar 24,110
Zellerbach Paper Co., Chicago; paper 3,112
Zimmerman Steel Co., Bettendorf, Iowa; steel castings 2,603

Navy Dept., Bureau of Supplies and Accounts:

Air Reduction Sales Co., New York; truck, tractor $14,869

Aluminum Co. of America, Washington; aluminum, alloy, ingot. 20,820
Aluminum Cooking Utensil Co., New Kensington, Pa.; pans, dish, aluminum 130,560
American Chain & Cable Co., Inc., American Chain Division, York, Pa.; chains and fittings 5,947
American Chain & Cable Co., Inc., Page Steel & Wire Division, Monessen, Pa.; wire, brass 9,561
American Steel & Wire Co. of New Jersey, Washington; cable, electric 11,529
American Electric Supply Co., Boston; cable, electric 5,415
American Steel & Wire Co. of N. J., Washington; cable, electric 94,535
wire, magnet, round 26,216
Anaconda Wire & Cable Co., New York; cable, rubber-insulated .. 89,888
cable, electric 38,880
Apollo Steel Co., Apollo, Pa.; steel, sheet 11,051
Atlas Tack Corp., Fairhaven, Mass.; rivets, steel, button, soft 7,292
Babcock & Wilcox Tube Co., Beaver Falls, Pa.; tubing, steel 19,460
Baldt Anchor, Chain & Forge Corp., Chester, Pa.; chain, anchor 8,505
chains and fittings 71,740
Bayonne Steel Co., Long Island City, N. Y.; steel, sheets 4..... 16,279
Buffalo Bolt Co., North Tonawanda, N. Y.; bolts and nuts, machine, steel log 5,530
Carnegie-Illinois Steel Corp., Washington; steel, sheets 82,782
Chase Brass & Copper Co., Inc., Waterbury, Conn.; wire, brass. 7,135
Coatesville Plate Washer Co., Philadelphia; washers, iron or steel 17,189
Collyer Insulated Wire Co., Pawtucket, R. I.; cable, electric ... 283,664
Commercial Acetylene Supply Co., Inc., New York; cylinders, acetylene 11,250
Commercial Engineering Co., Washington; purifiers, centrifugal 26,721
Electric Industrial Equipment & Supply Corp., Baltimore; wire and cable, lighting 56,805
Fargo Motor Corp., Detroit; trucks, motor 7,330
Federal Motor Truck Co., Detroit; trucks, motor 7,820
Flexitallic Gasket Co., Camden, N. J.; gaskets, pipe flange 22,257
General Cable Corp., Washington; cable, submarine 11,714
General Electric Co., Schenectady; cable, electric 214,048
Gold Seal Electric Supply Co., Philadelphia; wire, lighting and power 10,823
Gould & Eberhardt, Newark; machines, gear hobbing 39,785
Graybar Electric Co., Inc., Washington; wire, telephone 8,342
Clinton E. Hobbs Co., Everett, Mass.; chains, boat 7,213
Hooven Owens Rentschler Co., Hamilton, Ohio; parts, diesel engine. 45,002
Ingersoll-Rand Co., Washington; compressors, air 17,700
International Nickel Co., Inc., New York; nickel, copper alloy 20,982
Jack & Heintz, Inc., Cleveland; starters, hand, electric 944,400
Edward Katzinger Co., Chicago; pans, bread, steel 9,334
Kearney & Trecker Corp., Milwaukee; machines, milling 40,496
Kennecott Wire & Cable Co., Phillipsdale, R. I.; wire, copper, soft 8,475
Lidgerwood Mfg. Co., Elizabeth, N. J.; machinery, crane 180,000
Lloyd & Arms, Inc., Philadelphia; drills, radial 17,255
James P. March Corp., Chicago; gages, pressure 78,454
McKay Co., Pittsburgh; chains and fittings 279,859
Midway Electric Supply Co., Inc., New York; cable, lighting and power 21,591
Nathan Mfg. Co., New York; gages, water 5,075

National Electric Products Corp., Pittsburgh; cable, electric 296,372
Neu-Bart Stamping & Mfg. Co., Los Angeles; ladles, galley, steel 33,330
New Haven Copper Co., Seymour, Conn.; copper, sheet 8,659
Pennsylvania Flexible Metallic Tubing Co., Philadelphia; hose, metallic, flexible 22,510
Phelps Dodge Copper Products Corp., Habirshaw Cable & Wire Div., New York; cable, electric. 23,622
Pheoll Mfg. Co., Chicago; screws and nuts, machines 153,427
Pittsburgh Screw & Bolt Corp., Pittsburgh; bolts, anchor 126,295
Pratt & Whitney Div., Niles-Bement-Pond Co., W. Hartford; gear, cutter 7,598
John Reiner & Co., Inc., Long Island City, N. Y.; generator, diesel, engine 9,090
Republic Steel Corp., Cleveland; steel, sheet, flat 6,394
Revere Copper & Brass, Inc., Baltimore Div., Baltimore; plates, copper-nickel-alloy 20,176
Reynolds Wire Co., Dixon, Ill.; cloth, wire, steel 7,380
Donald Roebling, Clearwater, Fla.; tractors, amphibian 3,240,000
Russell Bursdall & Ward Bolt & Nut Co., Port Chester, N. Y.; nuts, regular, steel 33,703
William Scrimgeour, Washington; can openers 20,466
William Sellers & Co., Inc., Philadelphia; machine, milling 65,779
Simplex Wire & Cable Co., Cambridge, Mass.; cable, submarine 62,652
Stedfast & Roulston, Inc., Boston; shapers, heavy duty 9,092
Steel Products Engineering Co., Springfield, Ohio; hubs, propeller 18,780
Sullivan Machinery Co., Michigan City, Ind.; compressors, air ... 92,600
Uehling Instrument Co., Paterson, N. J.; gages, pressure 9,000
United States Gauge Co., New York; gages, suction, aircraft.. 13,175
Vulcan Iron Works, Wilkes-Barre, Pa.; locomotives, diesel-operated 71,009
Warner & Swasey Co., Cleveland; lathes, turret 84,232
Westinghouse Electric & Mfg. Co., Washington; bull gear and shaft 5,110
Winsted Division-Hudson Wire Co., Winsted, Conn.; wire, magnet, round 25,017
Worthington Pump & Machinery Corp., Washington; compressors, air 32,447
G. F. Wright Steel & Wire Co., Worcester, Mass.; cloth, wire, steel 11,693

War Dept., Other Agencies:

American Automatic Elec. Sales Co., Chicago; equipment $2,304
Austin-Western Co., Aurora, Ill.; road graders 10,420
Austin-Western Roach Machy. Co., Aurora, Ill.; loader for power grader 1,655
Bucyrus-Erie Co., South Milwaukee, Wis.; tools for well drilling machines 1,083
Carey Machinery & Supply Co., Baltimore; bench lathes 9,913
Chas. Fischer Spring Co., Brooklyn; clamps, wire 4,900
General Motors Corp., Chevrolet Division, Detroit; trucks, 1½ ton 1,515
Gramm Motor Truck Corp., Delphose, Ohio; semi-trailers 7,380
Graybar Electric Co., Point Breeze, Md.; cable 2,534
Leach Co., Oshkosh, Wis.; reel units 273,557
Muskogee Iron Works, Muskogee, Okla.; fabricated structural steel 343,490
F. E. Myers & Brothers Co., Ashland, Ohio; machinery 4,801
Proctor & Schwartz, Inc., Philadelphia; machines, screw 24,060
Raymond Mfg. Co., Div. of Associated Spring Corp., Corry, Pa.; clamps, wire 3,745
Charles Wagner, Hoboken, N. J.; off-set presses 5,000
Willson Products Co., Reading, Pa.; respirators and filters ... 22,403

75,000 Expected at ASTE Detroit Show

• • • **Far exceeding previous** exhibits in the amount of space taken, the forthcoming Machine and Tool Progress Exhibition of the American Society of Tool Engineers not only will be "sold out," but space formerly allotted to other purposes in Detroit's Convention Hall will have to be taken over for additional exhibits. All available floor space in the main (south) section of the convention hall, Detroit, and all of the North Cass hall have been assigned to exhibits. A portion of the North Woodward hall has necessarily been allotted the technical sessions and dining room, but a limited amount of space in this section may yet have to be set aside. The show dates are March 25 to 29.

Closely keyed to the nation's defense preparations, the technical sessions as well as the exhibits themselves will concentrate on bringing the latest technical information plus the latest developments in tools and machines to the attention of the executives and engineers who are now engaged in tooling up for the defense program. In excess of 30,000 are expected to register for the exhibition and technical sessions, while a show attendance in excess of 75,000 is forecast.

The special "preview" dinner to be held the day before the opening exhibition is sponsored by a group of leading industrialists, including K. T. Keller, president, Chrysler Corp.; Edsel Ford, president, Ford Motor Co.; Chas. E. Wilson, president, General Motors Corp.; C. W. Avery, president, Murray Corp.; and A. Berit, president, Hudson Motor Car Co. The dinner will be attended by an invited number of the country's prominent executives, engineers, educators and army and navy officers engaged in national defense preparations.

The principal speaker at the dinner will be Major General Chas. M. Wesson, Chief of Ordnance, U. S. Army, whose subject will be "The Job Facing Industry in Arming This Nation." The toastmaster will be L. Clayton Hill, manufacturing manager, Murray Corp., who will be introduced by A. H. d'Arcambal, consulting metallurgist, Pratt & Whitney Co. and president of the American Society of Tool Engineers, sponsors of the exhibition.

Program for ASTE Tool Progress Exhibit

Tuesday, March 25—8 P. M.

Subject—Aircraft Production.

Chairman—Walter F. Wagner, master mechanic, Lincoln Motor Car Co.

C. W. Van Ranst—chief aircraft engineer, Ford Motor Co., "Aircraft Engine Design & Production."

Louis Biehler, ass't chief tool designer, Vultee Aircraft, Inc., "Tooling for Fuselage Production."

C. C. Carlton, acting director, Automotive Committee for Air Defense, will lead discussion from the floor.

Wednesday, March 26—8 P. M.

Subject—Naval Ordnance Production.

Chairman—Homer C. Bayliss, co-manager Detroit branch, Motch & Merryweather Machinery Co.

Joseph A. Davies, chief planner and estimator, Naval Gun Factory, Washington, "Planning for Production of Naval Ordnance Units."

E. M. Sims, president, Metal Forming Corp., Elkhart, Ind., Member Board of Directors, National Association of Manufacturers, Member National Defense Committee, "Problems of Production of Naval Ordnance Units."

Thursday, March 27—8 P. M.

Subject—Industrial Education.

Chairman—Herbert D. Hall, president, Herbert Hall Co., Newark, N. J.

P. W. Brown, ass't works manager, Wright Aeronautical Corp., Paterson, N. J., "Industry's Need in Skilled Help."

Carl A. Gray, president, Grenby Mfg. Co., New Britain, Conn., "How Connecticut Solved the Industrial Training Problem."

J. R. Weaver, manager, Louisville Ordnance Division, Westinghouse, and past-president, A.S.T.E., will describe the work A.S.T.E. is doing for industrial training and will lead discussion from the floor.

Friday, March 28—6.30 P. M.
Book Cadillac Hotel

A.S.T.E. ANNUAL DINNER AND MEETING

Chairman—A. H. d'Arcambal, president, A.S.T.E., consulting metallurgist, Pratt & Whitney Div., Niles-Bement-Pond Co.

Installation of new A.S.T.E. national officers.

Speaker—L. R. Pennington, administrative ass't to J. Edgar Hoover, director, Federal Bureau of Investigation, "How to Prevent Sabotage to Our National Defense Program."

Army to Store Shells In Building At Toledo

Toledo

• • • **A seven-story structure** with 140,000 sq. ft. of space on the Nickel Plate railroad has been leased by the Army Ordnance Department for storage of shells and other ordnance equipment, it has been announced.

Production Planning Board Begins Work

Washington

• • • **Preliminary to** sessions at which recommendations for expediting the defense program will be made, the newly created nine-man Production Planning Board has been holding meetings under the direction of Chairman Samuel Richard Fuller, president of the North American Rayon Corp. Among other members of the board is Harry L. Hopkins, former Secretary of Commerce and former WPA director.

That the board, however, was established for post-war planning as well as to serve during the emergency was announced by OPM Director of Production John D. Biggers who disclosed selection of the board.

Mr. Fuller stated the the board's first task will be to study "in a comprehensive way" the problem of defense production for the benefit of OPM directing officers. As pointed out by Mr. Biggers the board's bases for recommendations both as to industrial planning during the emergency and as to post-emergency readjustments will be a study of production experience during the World War, the Industrial Mobilization Plan of the War and Navy Departments and the procedure followed during the past eight months by the Advisory Commission to the Council of National Defense and the War and Navy Departments. In the light of all this experience, Mr. Biggers said, the board will make recommendations with respect to planning of present and future production both for defense and civilian requirements.

The broad implications regarding the work of the new board have given rise to reports that the Administration is considering the establishment of coordinated defense program through the board covering both domestic armament and aid for Britain and that effectuating the plan awaits enactment of the lend-lease bill. Whether or not these reports have foundation, they were given emphasis because several days prior to the announcement of the appointment of the new board, Bernard M. Baruch, former head of the War Industries Board, was the President's White House luncheon guest. It is said that the President and Mr. Baruch discussed

Found: One Idle Bar Mill in Chicago Area

Chicago

• • • **A completely idle steel bar mill has been discovered in the heart of Chicago. Owned by the Santa Fe railway, the mill is located at the Corwith yards. Nine and 12 in. capacity is at the rate of 30 tons a day, and 22 in. capacity is pegged at 60 tons a day. The mill was unearthed during the combing of production facilities by the Ordnance Department. According to Santa Fe, the mill can be purchased if needed for the defense program but the facilities would have to be moved elsewhere and considerable repair work would be required.**

defense mobilization as it should be organized under present-day conditions. These reports took on the nature of conceiving the new board as both a planning and procurement organization directing the work of the OPM and the procurement divisions of the Army and Navy.

Ahearn Secretary of Air Hygiene Foundation

Pittsburgh

• • • **V. P. Ahearn** of Washington has been elected secretary of the board of trustees of Air Hygiene Foundation, and Theodore C. Waters of Baltimore has been made general counsel. John F. McMahon was promoted to executive secretary. The Foundation, located at Mellon Institute, here, is a non-profit organization of industrial concerns for the conservation of employees' health.

Lebanon Steel & Iron Co. Stockholders Vote to Liquidate

• • • **Stockholders of the** Lebanon Steel & Iron Co., on Feb. 20, voted to liquidate. The plant, at Lebanon, Pa., employs 650 men and its annual production is rated at approximately 15,000 tons of steel made in electric furnaces.

Operations may continue for another six weeks during the liquidation. The action is said to be due to inability of the firm to make a profit at present market prices of steel and raw materials.

Flint River Welding Section Is Organized

Detroit

• • • **A Flint River Division** of the Detroit Section of the American Welding Society has been organized. At a meeting held recently S. M. Spice, Buick Division of General Motors Corp., served as technical chairman, and C. L. Jedlick, Chevrolet, served as vice chairman. About 350 attended the meeting. It was addressed by R. T. Gillette, welding engineer, General Electric Co., Works Laboratory, Schenectady, N. Y. Mr. Gillette also addressed a welding group at Grand Rapids, Mich., following his appearance in Flint.

January Building Contracts Heaviest in 10 Years

• • • **Total building** contracts awarded in January amounted to $305,205,000, or 55 per cent above January, 1940, and the highest of any January since 1930. Commercial, manufacturing and small home building were all active during the period, according to the F. W. Dodge Corp. Additional income to be spent on consumer goods as the result of increased industrial activity has been a strong factor in the expansion.

Superior Steel's '40 Net Income $349,675

• • • **Superior Steel Corp.**'s total sales in 1940 increased 36.58 per cent over 1939, but at the same time stainless steel sales increased 53.7 per cent. According to Frank R. Frost, president, January operations were profitable, and full operations throughout the first quarter are indicated. Net income for 1940 amounted to $349,675.

Old Patrol Ship Being Refitted for Service

Toledo

• • • **The Toledo Shipbuilding Co.** is refitting the U.S.S. Wilmington, once a patrol ship on the Yangtse river in China, and in later years a training ship for Naval Reserves in Toledo. The refitting is costing $48,000 and it is expected that the ship will be ordered for active duty on the Atlantic.

Canada's War Bill Provides $1.4 Billions

Toronto.

• • • **A major step-up** in Canada's war effort is indicated by the announcement that the House of Commons has approved in principle the government's war appropriation bill, which now calls for $1,440,000,000. J. L. Ilsley, Minister of Finance, estimated the cost of operating the several branches of the armed forces for the next twelve months: Army, $666,574,000; Navy, $181,000,000; Air Force and air training plan, $421,000,000, of the latter amount $45,000,000 will be recoverable from Great Britain. The Munitions and Supply Department will spend $180,000,000 and other departments $32,000,000 on war work.

Canada Makes Armor Plate for First Time

Ottawa

• • • Armor plate of high quality is being made for the first time in Canada in preparation for the large scale production of tanks in the Dominion, C. D. Howe, Minister of Munitions and Supply, reveals.

While tooling-up is progressing rapidly in the shops where the tanks are being assembled, Ontario steel mills are engaged in producing the required armor plate and armor plate castings. Construction of a tank involves the assembly of some 200 separate pieces of armor plate, all shaped and machined, which range in thickness from an eighth of an inch to several inches, and in weight from 6 lb. to more than a ton.

J. E. Parke, Ontario manager of Carter-Halls-Aldinger Co., which has received the contract for construction of an $8,000,000 shell-filling plant to be erected near Pickering, Ont., stated that actual work on the new plant was to start Monday, Feb. 24. The proposed plant will cover an area of more than 2000 acres and will require over 4000 employees. Allied War Supplies Corp. will operate the new plant.

Oil Controller George Cottress announced that British American Oil Co., Ltd., has received permission to proceed with the erection of a $3,000,000 oil refinery to be built in the Ashbridges Bay area of Toronto. The plant will have capacity to produce 300,000 gal. of lubricating oil, plus a minimum of 20,000 gal. of gasoline, besides resulting by-products.

Department of Munitions and Supply, Ottawa, for the week ended Feb. 7, placed 2122 contracts valued at $4,707,466, of which orders valued at $362,437 were placed with U. S. companies. Capital expenditure included, De Havilland Air Craft of Canada, Ltd., Toronto, $199,000 and Boeing Aircraft of Canada, Ltd., Vancouver, B. C., $430,690. Order includes:

Metals—Consolidated Mining & Smelting Co. of Canada, Ltd., Montreal, $227,707.

Munitions — Hull Iron & Steel

Foundries, Ltd., Hull, Que., $107,406; Anaconda American Brass, Ltd., New Toronto, $42,145.

Electrical equipment — Chadwick-Carroll Brass & Fixtures, Ltd., Hamilton, $25,461.

Aircraft — Air Ministry, England, $72,110; Canadian Vickers, Ltd., Montreal, $121,328; Canadian Wright, Ltd., Montreal, $124,564; S. & S. Aircraft, Ltd., Ottawa, $47,385; Standard Tube Co., Ltd., Ottawa, $120,450; Steel Co. of Canada, Ltd., Hamilton, $34,184; MacDonald Brothers Aircraft, Ltd., Winnipeg, Man., $140,400.

Mechanical transport — Ford Motor Co. of Canada, Ltd., Windsor, $53,249.

Instruments (technical) — The Dominion Electric Protection Co., Montreal, $59,589.

Curtiss-Wright to Raze Old Airplane Factory

St. Louis

• • • **When its new plant** now under construction is half complete, Curtiss-Wright Corp. plans to wreck its old airplane factory built here in 1928. The factory proper of about $150,000 sq. ft., the power plant, and administration building will be razed. The new plant will have $1,800,000 sq. ft. and is expected to be in full operation by Aug. 1.

It is reported that McDonnell Aircraft Corp. has leased two additional acres of land at the Lambert-St. Louis Municipal Airport from the city for the erection of a plant addition.

Rockford Trade Schools Plan All-night Training

Rockford, Ill.

• • • All-night training schedules will be invoked by the trade schools here in an effort to broaden and speed-up training for the defense program. Already 800 men are receiving classroom education and shop training to take their place in defense industries. Over 100 are on the waiting list to enter these classes and all-night schedules are required to accommodate the group.

Canadian Government Fixes Prices on Scrap

Ottawa.

• • • **To provide** an adequate supply of iron and steel scrap to the Canadian steel mills, H. D. Scully, Canadian Steel Controller, has announced certain measures of control and direction of the scrap industry. Mr. Scully states that it has been essential that collectors extend their operations into new territories to augment the supply. New buyers, engaged in essential munitions and war industry are in competition for supplies, with the result that standard classifications and prices have become disturbed. To relieve this situation and to insure maximum flow of scrap through domestic channels, dealers in iron and steel scrap, as of Feb. 17, will be required to transact their business in accordance with the terms of the order. Mr. Scully states in his letter to the trade: "I enlist your full cooperation in the carrying out of the letter and spirit of this order and feel confident that it will not be necessary to apply penalties to enforce it."

In order to stabilize prices of scrap steel and to increase supply by rendering possible shipments through territories beyond the present economic collecting areas, the Steel Controller hereby orders that prices not exceeding those shown herein shall be paid by consumers for steel scrap effective on and after Feb. 17, 1941. Consumers' maximum prices follow:

No. 1 heavy melting steel, obtained from rails, etc., not to exceed the basis of $18 gross ton f.o.b. Hamilton, Ont., and $18 per gross ton, f.o.b. Montreal. Stable selective electric furnace and cupola steel scrap not exceeding 24-in. in length, free from alloys, to carry an extra of $3 per gross ton over the price of No. 1 heavy melting steel.

Dealers' classifications and differentials:

(a) No. 2 steel scrap to be $1.50 a gross ton less than No. 1 heavy melting steel price.

(b) That oversize No. 1 scrap be $1.50 a ton less than the heavy melting base.

(c) That oversize No. 2 be $3 per ton less than No. 1 heavy melting.

(d) That turnings and borings be a minimum of $5 per ton less than No. 1 heavy melting.

(e) That scrap rails be $1 per ton over the prices of No. 1 heavy melting. Car rims and chassis to be classified as dealers' No. 1 heavy melting steel. Scrap iron rails and malleable scrap to be $20 per gross ton. Miscellaneous malleable scrap, $19 per gross ton.

The above ruling deals exclusively with steel scrap, and no control has been announced with regard to the cast scrap market. Prices of cast scrap have had a sensational rise during the past week or 10 days. The price on machinery cast skyrocketed in the past week to a level where local consumers now are paying $26 net ton which is the same price as is paid for foundry pig iron, 2.75 silicon, or 50c a ton above the base iron price of $25.50, delivered Toronto. Dealers state they have an open market demand for all the cast scrap they can deliver at this price.

Another factor is difficulty in obtaining sufficient pig iron to meet all demands with the result that cast scrap is necessary to maintain the melt. Early in the week when cast was going to consumers at $25.50 to $25.75 a net ton, some consumers stated that they would drop scrap entirely and use only pig iron, but on checking the iron market it was discovered that the latter producers are not prepared to make such a large jump in deliveries.

The recent change in specifications and prices on steel and iron scrap has created a new problem, especially in connection with offerings to dealers. Dealers state that while there is enough steel scrap coming out to fill orders, cast is scarce. Some collectors have withdrawn from the market, holding off in hope of higher prices. However, it is expected the automobile wreckers will start wrecking on a much larger scale next month and the larger tonnages from this source may offset the curtailment caused by h e d g i n g in other quarters.

U. S. Will Build Tin Smelter for S. A. Ore

Washington

• • • **Federal Loan Administrator** Jesse Jones announces that a tentative agreement had been made with N. V. Billiton Moatschapij, the Netherlands East Indies, to construct a government owned smelter, costing between $2,500,000 and $4,000,000 to smelt about 18,000 tons annually of Bolivian tin recently imported into the United States.

The plant will be built "somewhere in the South," Mr. Jones said, reviving reports that the site will be Houston, Texas, and will produce about one-fifth of the country's normal consumption. He would not forecast when operations will begin but said good supplies of tin are on hand for defense needs.

Mr. Jones also told of plans for the construction with the aid of $9,250,000 federal funds of a plant for the manufacture of magnesium and said that the RFC is considering additional plans (still in the study stage) for the production of aluminum.

The magnesium plant would be built near San Francisco and melt Utah ore, Mr. Jones said, with an annual output of between 12,000 and 15,000 tons. It would be a private operation of Henry J. Kaiser, who was said to have a new patent for production of the metal. Mr. Jones said that the Dow Chemical Co., is adding to its Texas plant, which produces magnesium from sea water.

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Washington.

• • • **Declaring that** it might have unfortunate repercussions on the defense program and the national economy as a whole, a warning against continuance of the present unstable condition in the tin market was issued last Thursday by W. A. Harriman, chief of the OPM's Materials Branch, Division of Production. Mr. Harriman will leave soon for London where he will take up his new assignment as "special defense expediter."

On the heels of Mr. Harriman's statement manifesting concern over the rise in the price of tin because of heavy buying in the New York market, OPM Director of Priorities Edward R. Stettinius, Jr., announced the appointment of Philip D. Reed, chairman of the Board of the General Electric Co., as a consultant and the addition of Ralph G. Farrell, chairman of the board of the Fairmount Aluminum Co., Fairmount, W. Va., as producers' representative of the Aluminum and Magnesium Priority committee. The appointment of Mr. Reed means that the director of priorities will have two consultants. The other is Charles E. Adams, now on leave from his position as chairman of the Air Reduction Corp.

Defense Boom Empties Church Pews at Gary

Gary, Ind.

• • • Ministers here complain that church pews are conspicuous by their lack of tenants, that choirs have been seriously depleted, and that Sunday school teachers have failed to answer the roll call with "present." Reasons are attributed by Gary Ministerial Association to the defense boom in the steel industry.

Drafting Skilled Men A Danger—Flanders

• • • **Deferment from** army service for skilled workers in defense production industries was urged by Ralph E. Flanders, No. 2 man on *OPM's* machine tool priorities committee, at a forum on ordnance procurement conducted by the New York Post of the Army Ordnance Association. The forum was held at the Engineering Societies Auditorium on Feb. 24.

Mr. Flanders cited the example of France which had carried the pollicy of non-deferment of skilled workers to its tragic conclusion. "Up until the fall of Paris," he said, "we had nine men in our French office whose principal job was to train workers in the Hispano-Suiza aircraft engine plant how to operate our machines (Jones & Lamson).

"Because the French army drew men away as rapidly as we trained them, however, aircraft production never really did get under way at this new plant. I hope that this fact will be a lesson to our local draft boards here," he concluded.

Knudsen And Hillman Oppose Strike Curbs

Washington

• • • **William S. Knudsen,** director general, and Sidney Hillman, associate director general of the Office of Production Management, indicated before the House Judiciary Committee last week they are in substantial agreement that any legislation designed to curb strikes in defense industries was highly undesirable. Both minimized the extent of strikes under the defense program and urged that Congress permit management and labor to work out common problems.

Appearing before the committee separately on two successive days, the two top-ranking OPM officials agreed that a "cooling-off" period, preceding the calling of strikes, was desirable but should not be imposed by legislation. Mr. Knudsen recommended that such a provision, similar to one provided in the Railway Mediation Act, should be included under agreements between employers and unions rather than in the law. Mr. Hillman gave qualified support to such a provision embodied in a pending bill introduced by Representative Howard W. Smith, Democrat of Virginia.

He indicated also that, in effect, the principle is already in operation through commitments he has received from the "responsible leaders" of all national labor organizations. Under these commitments, he testified, union leaders are bound to insist on negotiations of all labor grievances by local unions before strikes were called.

Mr. Knudsen, basing his testimony on his statement that by and large the defense program had been hampered "very little" by lack of cooperation either from capital or labor, turned aside suggestions made by committee members that strikers should be drafted and forced back to work.

"You can't make a man a criminal because he is striking," Mr. Knudsen said.

Questioned closely about government efforts to mediate the Allis-Chalmers strike, the former General Motors executive attributed the strike to what he described as "inexperienced leadership" of union officials.

CIO Warns Bethlehem Steel of Walkouts

• • • **SWOC leaders** this week were threatening Bethlehem Steel Corp. with strikes at its various plants following suspension of more than 250 men at the coke oven department of the Lackawanna (Buffalo) plant. The 250 men were given verbal warnings, then written notices of suspension following ten days of work stoppages in which they walked off the job for an hour each day.

The SWOC claimed that a membership vote early this week empowered officers to call a strike at the Lackawanna plant. Of 7452 SWOC members said to have voted in a 60-hr. election in Lackawanna, a total of 6411 demanded strike action and 1001 voted against such action. (The plant employs approximately 14,000 men.)

Van A. Bittner, national director of the SWOC drive to organize Bethlehem plants, declared that unless President Roosevelt intervenes, a strike of a major portion of Lackawanna employees of the company is imminent.

American Steel & Wire Outlaw Strike Ends

Donora, Pa.

• • • **A sharp demand** by Philip Murray, CIO and SWOC chieftain, that strikers return to work, ended a one-day outlaw strike here at the American Steel & Wire Co.'s zinc works last week. Grievances involving an incentive system at the plant will be taken up in accordance with the company's contract with the union. The local lodge had previously ignored a demand to return to work issued by Clinton S. Golden, regional director of the SWOC. Approximately 900 workmen were affected by the walkout.

NLRB Orders Ford Plant To Bargain with CIO

Washington

• • • **Ford Motor Co.'s** Richmond, Cal., plant was ordered by the National Labor Relations Board last week to bargain with the CIO's United Automobile Workers Union and to embody the terms of any agreement reached in a signed agreement. The company also was ordered to offer reinstatement to 142 employees with back pay, and to terminate the practice of distributing among its employees printed materials which the Board regards as an interference with workers in "the exercise of rights guaranteed by the Wagner Act."

Board Member William M. Leiserson disagreed with the majority to the extent that he upheld the recommendation of the trial examiner that the company not be required to reinstate 14 of the 142 employees.

The CIO union began its organizational drive at the Richmond plant late in 1936. Several months later the NLRB alleged upon complaint by the union that "hostility" to the organization "swept through the ranks of supervisory employees," resulting in a plan to "discourage membership in the UAW."

West Coast Foundry Honors Eight Veteran Employees

• • • **Enterprise Engine** & Foundry Co. was well represented at a recent testimonial dinner given in San Francisco under the auspices of the National Association of Manufacturers and honoring executives and employees who have served thirty-five years or more with their present employers. A contingent of eight Enterprise "old timers" fulfilled the qualification with terms of service ranging from thirty-five to fifty-four years. Henry Martens, vice president, and J. W. Heaney, secretary, have both served Enterprise since 1886.

2nd Strike Hits Universal Cyclops

Pittsburgh

• • • **Approximately 1400** employees of the Universal Cyclops Corp., Bridgeville, Pa., are again idle following the second outlaw strike over the question of grievances and wage rates. A few weeks ago an unauthorized strike was compromised, thus putting the men back to work on a $4,000,000 national defense program. A wage survey in nearby steel plants now being made may be the basis of a settlement.

The illegal strike of 400 workmen at the Bridgeville plant of the Vanadium Corp. of America was still in progress early this week. Only a quick return to work can save the jobs of a majority of these workmen, according to A. J. Federoff, regional director, CIO.

In accordance with a clause in the union contract, the men were notified of their dismissal by the company after being absent from work for five days, but Federoff indicated if the men returned to work immediately they would regain their "privileges."

Chicago Plants Expand Rapidly in Arms Program

Chicago

• • • **More than $8,535,000** in plant expansions of building and equipment was started by Chicago firms in February. This figure does not include the Buick and Studebaker aircraft engine plants, which alone represent a proposed combined investment in excess of $47,500,000.

12 of 156 N. Y. Machine Shops Have Defense Jobs

• • • Twenty-nine of 35 machine shops sending complete replies to questionnaires issued recently by the Merchants Association of New York City to 191 machine shops in Manhattan, report an interest in obtaining new or additional defense work. A total of 191 such shops was polled.

A later telephone check of the 156 companies which did not answer the questionnaire permits the inference, according to the Merchants Association, that these firms are not interested in additional defense work because of sufficient business already on hand, possible shortage of skilled men and supposed difficulties in handling government business.

Only three of the machine shops which did reply reported that they have already received contracts directly from the government. Nine firms of those reporting had received subcontracts. A variety of machines was found available for additional work. If a two-shift, 40-hr. week were adopted it was found that the additional productive capacity of the concerns reporting would amount to 1,387,880 machine hours a year.

Tenth of Plants In NAM Survey Have Prime U. S. Contracts

• • • **One-tenth of the** companies reporting to the National Association of Manufacturers in its nation-wide survey of potential defense production facilities have primary government contracts, one-fifth are subcontractors for defense work and the remaining companies so far are not active factors in the defense picture.

One-half the plants answering they do not have defense contracts believe they have equipment to handle such work, Walter D. Fuller, NAM president, said in an interim report on the survey, results of which will be turned over to the OPM.

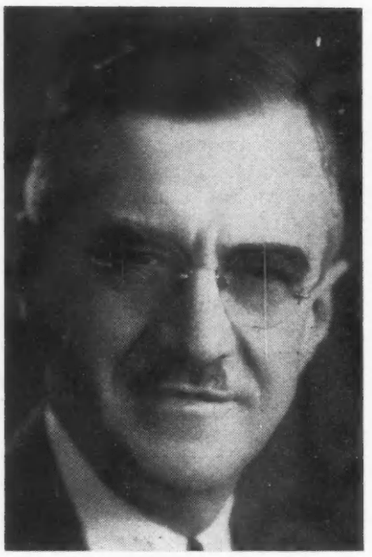
Typical of replies to the NAM survey is Indiana, where the first 100 plants reporting disclosed 16 manufacturers with primary defense contracts, 12 with defense subcontracts, and 72 with no defense work. Thirty-six of the 72 without defense orders have machines and machine tools with which tanks, guns, shells or parts of these items might be fabricated.

"This development of community cooperation is the newest thing industrially in the nation today," Mr. Fuller said. "It is mushrooming."

In attempting to solve one of the most complicated problems confronting U. S. defense, i.e., enlisting small plants for defense, the NAM reported that the Pennsylvania Chamber of Commerce has received such requests for help from prime contractors as these:

PENNSYLVANIA manufacturer of airplane parts and instruments: "We need production of parts from the following machines: 2½ to 5 in. Cleveland & Gridley automatic screw machines; Peterman, Dechler & Torno automatic screw machines; small accurate milling machines of the watchmaker type; sensitive drill presses up to No. 80 drill (Muehlmatt type).

CONNECTICUT arms manufacturer: "We are at the present time seeking sources for screw machine work, as well as drawing dies and punches for ammunition. If you can refer to us any sources capable of handling these items, it would be appreciated."



Arthur A. Wagner, sales manager of the hot rolled department of the Jones & Laughlin Steel Corp., Pittsburgh, joined the steel unit of the OPM materials branch in Washington on Wednesday.

NEW JERSEY munitions maker: "We are interested in contacting machine shops equipped with vertical turret lathes of the Bullard type, with minimum of 24 in. revolving table capacity, for facing and turning large armor steel castings."

OHIO manufacturer of engine fittings: "We are interested in any screw machine plants that could run aluminum, steel or brass parts for both the Army and Navy, Ordnance Department and Aviation Department; also any steel forgings or brass forging plants that might be available."

NEW YORK arms manufacturer: "If you have a list of firms in a position to take on subcontract work for the Browning .50 cal. machine gun, we would be glad to have a copy of it."

PENNSYLVANIA vehicle manufacturer: "We are interested in obtaining three Bullard vertical boring mills of the Cutmaster type, in either 64 in. or 54 in. sizes."

NEW JERSEY pyrotechnics maker: "We are particularly interested in finding (a) a brass foundry which has core machines, (b) a screw machine factory which has four spindle or six spindle machines for doing screw machine work up to 2 in. in diameter, (c) wood working plants which can give us quick deliveries."

$1.4 Billions Asked For 3600 Bombers

Washington

• • • **Here are the major** items covered in President Roosevelt's request to Congress on Monday for $3,812,311,197 in new defense appropriations.

$1,412,216,000 — army aviation. The assumption is that the bulk of this amount, which includes $888,326,000 in cash and $524,025,000 in contractural authority, will go for the purchase of 3600 bombers under the program for four assembly plants to be constructed in the Midwest, the aircraft parts to be manufactured by the automobile industry.

$915,104,751—For the procurement of munitions of all types.

$399,000,000—To expedite production of equipment and supplies, including the construction of new plants and the acquisition of land.

$104,425,000—For military construction, including defense installations such as housing, storage, fortifications, airdromes, piers, roads, railroads.

The total figure includes $1,716,225,000 in cash and $2,096,086,197 in contract authorizations. Half of the $3,812,311,197 figures represent contemplated expansion over and above that previously authorized under the defense program. The balance is for projects originally asked to be provided for in the regular army budget for 1942.

Willys to Start Shell Shipments in April

Toledo

• • • **Deliveries of forged** aircraft and truck parts on American and British contracts amounting to $1,500,000 are being made by Willys-Overland Motors, Inc., and rapid development of other national defense operations is under way.

Navy machine gun parts on a contract of $1,912,000 will start this month and work is progressing on $6,000,000 of shell hoists for the Navy. Shipments against an $8,862,000 shell order for the Army are scheduled to start April 10. Deliveries of the first of the four-wheel drive Army reconnaissance cars is planned for June 20.

Mandatory Priorities Invoked on Machine Tools and Aluminum

Washington

• • • **The Office of** Production Management, taking its first step to invoke mandatory priorities, on Monday subjected machine tool builders and aluminum producers to an industry-wide compulsory priority status. The action was announced at a press conference held by Director of Priorites Edward R. Stettinius, Jr., who said the step was essential because the situation was rapidly becoming acute in both industries. He indicated that similar action will follow in other unspecified lines.

Machine tool builders and aluminum producers also were instructed in letters mailed out on Monday to apply a preference rating of A-2 on all defense orders not already bearing a higher rating.

The letter to machine tool manfacturers said:

"In order that you may prefer all orders going directly or indirectly into the manufacture of material for the Army or Navy (herein called defense orders) without serious consequences to you by reason of contract or other obligations to customers desiring the same material for civilian purposes, I am invoking the authority reposed in the Office of Production Management under the Act of June 28, 1940, pursuant to the Executive Order of the President dated Jan. 7, 1941, and you are accordingly ordered to serve all such defense orders in preference to any non-defense orders, in so far as this course is necessary to comply with the delivery dates on such defense orders."

Mr. Stettinius' letter referred to a communication dated Jan. 31 and sent to machine tool builders in which he had requested them not to fill any orders after the end of February except those going to defense industries. The action taken on Monday makes the Jan. 31 instruction mandatory.

Mr. Stettinius also wrote that "If any non-defense orders that are necessarily interfered with by this direction must, in your opinion, be given prior status, kindly communicate the facts directly to this office, if you have not already done so."

The letter of explanation noted that the order expires May 31 but Mr. Stettinius said that it will be extended from time to time if necessary.

In aluminum, it was explained that the action was necessary because of recent adverse changes, making a vastly different picture than two months ago. Four principal factors which have changed were listed by Mr. Stettinius as the withholding from the market of large quantities of aluminum scrap, a step-up in the British military program, the maintenance by fabricators of larger working stocks, and a marked increase in the manufacture of aluminum products for purely civilian consumers.

The letter to aluminum producers emphasized the importance of meeting defense needs in preference to civilian requirements, and directed that until further notice, producers submit to the Priorities Division at least one week in advance of the beginning of the month complete booking of orders for the ensuing month.

"In doubtful cases we will determine what are defense orders," Mr. Stettinius wrote. "The specific preferences among the defense orders covered by this general preference rating will be governed by delivery dates in accordance with the determination made by us when you submit your orders as above."

Authority for invoking formal mandatory priorities is contained in the law passed by Congress on June 28, 1940, and in a subsequent Executive Order issued by President Roosevelt on Jan. 7 this year.

Olds, Fairless Meet With the President

Washington

• • • **Chairman Irving S. Olds** and President Benjamin F. Fairless of the United States Steel Corp. held a half hour conference with President Roosevelt on Wednesday of last week, after which Mr. Olds said the call made was to pay respects to the President and tell him on behalf of the Steel corporation what it is doing in connection with national defense work and of its desire to serve to the best of its ability.

Steps Taken to Ease Shortage of Nickel

Washington.

• • • **The Priorities Division** of the Office of Production Management and leading steel producers at a meeting in New York last week adopted a two-point program to ease the present tightness in the supply of stainless steel and other nickel steels essential in defense industries. Nickel supplies come almost wholly from Canada. The steps agreed upon were:

1. To give first call on stainless steel and other nickel steels to defense industries.

2. To consult with and give technical advice to their customers, in both the defense and non-defense spheres, in an effort to help them conserve the use of nickel steels wherever possible.

Director of Priorities E. R. Stettinius, Jr., whose division was represented at the meeting by Samuel S. Stratton of the Minerals and Metals Section, said that representatives of the producers felt there were a number of cases in which the shortage of nickel might be relieved to some extent through changes in order specifications.

Mr. Stettinius said it was agreed that the shortage in the supply of nickel was largely responsible for the tight situation in the supply of stainless steel and allied products. In this connection, it was pointed out, that there was a necessity for acquiring working stocks. Producers were asked to furnish the Priorities Division with specific information as to their present stocks of nickel, anticipated requirements, rates of consumption and delivery schedules.

↓ ↓

Washington

• • • **A Survey of** nickel supplies which is expected to serve as a "statistical basis for future appropriate action" was announced on Tuesday by OPM. W. Averell Harriman, chief of the OPM material branch, said the survey will cover "the unnecessarily large inventories" in the hands of non-defense manufacturers.

New Techniques Reviewed by A. I. M. E.

(CONCLUDED FROM PAGE 64)

deoxidation practice used and finishing mill conditions obtained purposely to acquire certain other desirable properties. It is known that an increase in grain size adversely affects impact strength.

Therefore, it cannot be said, according to Mr. Woodworth, that the hot rolled physical properties of bessemer steels suffer in comparison with open hearth steels, and indeed, some superiority is shown, which should be particularly valuable in certain grades, such as structural steels.

The control of temperature, degree of oxidation, and a better understanding of the fundamentals affecting nitrogen content are all basic problems, and Mr. Woodworth's paper contributed considerable data to the general store of knowledge. However, there is much to be learned. It is well known that the technical attention, which has been given to the bessemer process in the recent past at the Carnegie-Illinois plant, has been surprisingly repaid in better quality, increased manganese yield, and greater customer satisfaction.

MR. WORK'S paper on photocell control for bessemer steel making presented considerable detail on the actual control practice and equipment, much of which has not been discussed in previous papers on this subject by Jones & Laughlin men. This practice was said to give a rapid and quantitative indication of changes in the flame, which are recorded graphically for each blow. The interpretation of these curves was discussed and procedures for applying the control practices were shown.

After trying a variety of different photocells and methods for viewing the flame, the preferred field of the viewing element encloses substantially the whole flame at its maximum size. Naturally, this also includes areas not covered by the flame, but these do not interfere with the flame reading, if suitable precautions are taken in locating the equipment, because of the relatively great intensity of the radiation of the flame. It should be noted perhaps that this arrangement does not restrict the radiating area to a given size, and changes in the flame size affect the readings. Under these conditions it might be thought that the reading would tell little about the temperature of the flame and perhaps even less about the metal blown in the converter. However, it so happens that when the flame is at its maximum radiating power, the radiation is related to the temperature of the blown metal, so that it is possible to get an approximate indication of temperature from the recorded flame curve. The factors favoring selection of such an arrangement are that: (1) it tends to average out variations in the flame from point to point, (2) the relative size, as well as intensity of the flame, affects the readings, and variations in size are significant, and (3) approximate information on temperature is obtained at the full-flame reading.

The active element for picking up the radiation is a group of three PJ-22 tubes, manufactured by the General Electric Co. The cells are mounted side by side in a housing and set up so the field of view includes the whole flame. Under these conditions, variations in the position of the flame will cause a minimum variation in the reading. The unit is set up about 60 ft. from the converter; the exact location, of course, is controlled by mechanical conditions in the mill, such as: (1) convenience of mounting on parts of building, (2) possible interference by cranes or smoke, (3) exclusion of other bessemer flames, the sun, and the sky from the field of view, (4) ease of servicing, and (5) a variety of other considerations related to the physical surroundings. It is by observing these precautions that the effect of the surroundings on the readings is held to a minimum. The response of the cells is amplified and recorded, so that there is available, so to speak, an autograph of each blow.

In order to use the photocell control most effectively, it is desirable to employ filters on the viewing element. Approximately 80 different individual filters were tried, with many combinations, and it was observed that the filters noticeably altered the trace of the flame curve. For example, the effect of steaming a blow and the flash-up at the beginning and end of the blows are clearly evident when an infrared filter is used, but with certain other filters the changes are not nearly as pronounced, and may disappear entirely.

Furthermore, the selection of the filter has an influence on the clarity with which the end point of the blow is shown. Hence the selection of the filter is very important. To date, two arrangements have been employed most extensively. The first included an infrared filter. The infrared filter has the advantages that: (1) the reading is less influenced by smoke or steam between the flame and the photocell; (2) the readings are less influenced by daylight; (3) steaming and the end point are clearly shown.

When the infrared filter was first used, the difference in response from other filters was noted. A question was raised as to whether the infrared radiation of the flame, which was invisible to the blower, followed the same general pattern of the visible flame. To answer this, a series of photographs was taken simultaneously in the infrared and visible regions throughout the blow. Allowing for the recognized limitations in this comparison due to the sensitivity of the plates and paper, and the fact that the relative exposure was not identical, it is apparent that the flames seen by the photoelectric "eye" and the human eye are substantially equivalent.

Despite the advantages of the infrared filter, it showed certain unfavorable features when an attempt was made to indicate the end of the blow by an automatic buzzer signal; therefore later it was replaced by a combination of two filters, one of which can best be designated as a heat-absorbing filter and the other as an ultraviolet absorbing filter. This combination is now used regularly in the mills and was referred to in Mr. Work's paper as the "standard photocell filter combination." The differences between this arrangement and the one using the infrared filter are that: (1) steaming causes a less pronounced drop in the radiation curve, and (2) the end point falls lower on the curve and varies less in its relative position from blow to blow.

The infrared unit covers a range outside the range of human vision, while the present standard combination extends over the range of human vision and into the infrared.

Personals

Change is inevitable in progressive Industry. Change is constant.

• **Ernest C. Low** has been appointed general manager of sales of the John A. Roebling's Sons Co., Trenton, N. J. Mr. Low has been identified with the Roebling organization for 32 years. Upon graduation from college in 1909 Mr. Low joined the California division of the company at Los Angeles, serving in various sales capacities. He was appointed manager of the San Francisco branch in May, 1930, and on Jan. 1, 1940, was elected president and general manager of the John A. Roebling's Sons Co. of California. Mr. Low will assume his new duties on or about March 1, with headquarters at Trenton, N. J.

• **Thomas E. Dunn,** director and works manager of the Bullard Co., Bridgeport, Conn., has resigned because of ill health. He will be succeeded as works manager by **Foster P. Whitworth.**

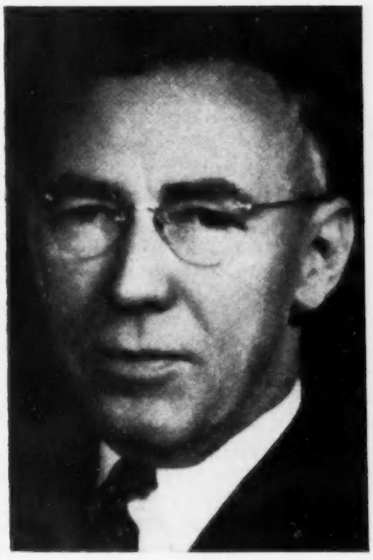
Mr. Dunn joined the General Electric Co. in 1901 after his graduation from Brown University. He left that company seven years later and gained additional industrial experience with the Franklin Motor Car Mfg. Co. and the Crocker-Wheeler Co., leaving the latter company in 1917 to join the Bullard Co. as night superintendent of the engineering works. He was made assistant production manager of the Bullard Machine Tool Co. in 1919 and production manager two years later. In 1922 he became assistant works manager and a few years later works manager. During this period he was instrumental in the development of the Bullard-Dunn electrochemical descaling process.

• **William H. Seaman,** vice-president in charge of rolls of Mesta Machine Co., Pittsburgh, has resigned to become president and general manager of the National Roll & Foundry Co., Avonmore, Pa., succeeding **D. H. Slonaker,** who has been made chairman. Mr. Seaman attended Washington and Jefferson College and Carnegie Institute of Technology. Early in his business career he was associated with the Seaman-Sleeth Co., Pittsburgh, later the Pittsburgh Rolls Corp. In 1924 he became vice-president in charge of rolls for the Hubbard Steel Foundry Co., Chicago, and six years later was made vice-president of the Continental Roll & Steel Foundry Co. In 1935 Mr. Seaman became vice-president in charge of rolls of Mesta Machine Co.

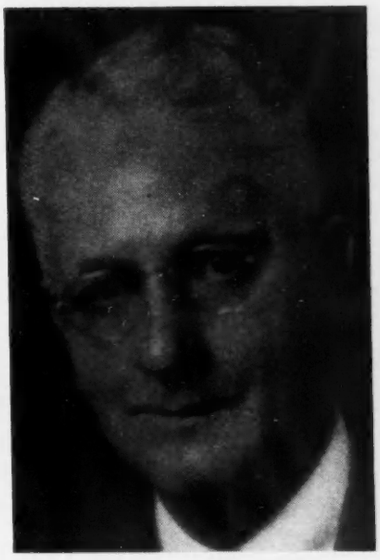
• **Verne E. Minich,** founder and until recently president of the American Foundry Equipment Co., Mishawaka, Ind., has been made chairman of the board. **Otto A. Pfaff,** formerly vice-president and general manager, is now president, continuing as general manager. **Leslie L. Andrus,** formerly sales manager, has been appointed vice-president in charge of sales.

• **Dr. William C. Theisinger,** since 1935 welding and metallurgical engineer of Lukens Steel Co., Coatesville, Pa., has been appointed director of welding research. He received his Doctor of Science degree from Harvard University in 1935.

• **W. P. Wooldridge,** formerly manager of manufacturing and construction accounts, San Francisco district, Columbia Steel Co., has been appointed general manager of sales for Pacific States



ERNEST C. LOW, general manager of sales of the John A. Roebling's Sons Co.



THOMAS E. DUNN, who has resigned as director and works manager of the Bullard Co.

WILLIAM H. SEAMAN, president and general manager of the National Roll & Foundry Co.

Steel Corp. Pacific States operates a rolling mill at Niles, Cal., and has opened offices in the Rialto Building, San Francisco.

Mr. Wooldridge joined the Steel Corporation in 1924 following his graduation from Lehigh University in mining and metallurgy. After serving with National Tube Co. in New York, he joined the Columbia company in 1932. **Stanley Scott** succeeds him at Columbia.

• **T. I. Phillips,** formerly general works manager, East Pittsburgh works, Westinghouse Electric & Mfg. Co., has been appointed assistant to **George H. Bucher,** president. Mr. Phillips will continue to be in charge of the headquarters manufacturing staff, the small motor, lighting and transformer divisions and the construction department of the company. He joined Westinghouse in 1915 and was appointed general works manager in 1935.

• **Ashland Henderson, chemical** engineer, has been named to the technical staff of Battelle Memorial Institute, Columbus, Ohio. He has been assigned to a research investigation which is aimed at the development of metal surfaces resistant to wear, corrosion, and chemical attack for specialized industrial uses. Mr. Henderson was formerly metallurgist with the Frigidaire division of General Motors.

• **David J. Byrnes,** former sales manager of the Hein-Werner Motor Parts Co., Waukesha, Wis., has been elected president and general manager of the Union Equipment Corp., Milwaukee, which manufactures furniture, store fixtures and equipment, and in which he has purchased a controlling interest.

• **James S. Duncan,** former vice-president and general manager, has been elected president of the Massey-Harris Co., Racine, Wis., and Toronto, Canada, to succeed the late T. A. Russell. **W. K. Hyslop,** general manager of the Racine plant, has been named vice-president and will remain as the Racine manager. **E. G. Burgess,** former factory superintendent, has been made assistant general manager and a member of the board of directors. **P. D. Corkum,** former master mechanic, is the new factory superintendent and

T. I. PHILLIPS, assistant to president of Westinghouse Electric & Mfg. Co.

C. P. Milne, assistant to the general manager, was elected a director.

• **I. F. Pohlmeyer** has been appointed sales engineer in the Pacific Coast territory for the Ohio Seamless Tube Co., Shelby, Ohio. Mr. Pohlmeyer received his formal technical education at Carnegie Institute and the University of Purdue. He was formerly associated with Globe Steel Tube Co. as inspection engineer.

WILLIAM L. DOLLE, president and general manager of Lodge & Shipley Machine Tool Co., whose election to that position was announced in these columns recently.

• **Han Bohuslav,** who has been associated for the past eight years with the Enterprise Engine & Foundry Co., San Francisco, has been appointed vice-president in charge of engineering. **C. G. Cox,** who joined the company in 1934, has been made vice-president in charge of sales, and **C. M. Sayre,** vice-president in charge of production.

• **William A. Cather,** heretofore advertising manager of Babcock & Wilcox Co., New York, has been elected vice-president of Michel-Cather, Inc., formerly A. Eugene Michel & Staff, Inc., 2 Park Avenue, New York.

• **Albert N. Koch,** president of Steel Plate & Shape Corp., Detroit, for the past six years, has resigned to become assistant to the president of Felt & Tarrant Mfg. Co., Chicago. He will remain a member of the board of the Steel Plate company and retain his interests in this company.

• **S. Allan Jacobs,** general sales manager of the Inca Mfg. Co., division of Phelps Dodge Copper Products Corp., has been elected a vice-president of Phelps Dodge company.

• **R. B. Wilfong,** of the Pittsburgh Tube Co., Pittsburgh, has been made vice-president in charge of sales.

• **G. M. Carvlin** has been appointed assistant vice-president, and **W. L. Gable** has been named sales manager for the engineering and construction division of Koppers Co., Pittsburgh. Both formerly were sales engineers. Mr. Carvlin joined Koppers in 1925 as a member of the research department. He later entered the operating department, from where he was promoted to sales engineer in the sales department. Mr. Gable entered the Koppers engineering department in 1916. He later was successively chief draftsman, engineer, and sales engineer.

• **H. B. Pulsifer,** metallurgist, author and teacher, has joined the American Metal Treating Co., Cleveland, in executive and professional capacities.

Obituary

• **Lewis E. Saunders,** a vice-president of Norton Co., Worcester, Mass., and pioneer in the development of electric furnace abrasives, died Feb. 20 after an illness of two weeks. He had been in poor health for several months. Mr. Saunders had been vice-president of Norton since 1937, and a director since 1921. He also formerly was manager of the company's abrasive plants and research laboratories. In January, he gave up most of his active responsibilities, and had served since as a consultant. Before joining Norton Co. he was associated in Ampere, N. J., with Charles B. Jacobs, who developed the process of making the aluminous abrasive known as Alundum. This product was acquired by the Norton Co. in 1900, and Mr. Saunders became associated with the Worcester company three years later. He served variously as chemical engineer, metallurgist and superintendent of abrasive plants and research laboratories. He was 67 years old.

• **Edward P. Connell,** secretary-treasurer and general manager of the Falk Corp., Milwaukee, died Feb. 8 in a Milwaukee hospital after a short illness. He had been with the firm 28 years. He started as an order clerk and accountant in 1913, and was later made purchasing agent. In 1924 he was appointed controller and in 1939 became treasurer. He was advanced to the position of general manager last March and elected a director of the firm. For years he was an active member and committee man for the American Gear Manufacturers' Association. He was 56 years old.

• **Richard Peters, Jr.,** who was long engaged in the pig iron trade in Philadelphia, died in Pennsylvania Hospital, that city, on Feb. 15 after a short illness. He was 60 years old. Mr. Peters was for many years in the Philadelphia office of Rogers, Brown & Co., predecessor of the Rogers Brown Lavino Co. He was a student of the early history of iron making in Pennsylvania and as an authority on this phase of America's early industrial history had taken a prominent part in the work of the Historical Society of Pennsylvania. In recent years Mr. Peters had been associated with Robert Lea, also an old-time Philadelphia pig iron merchant, in the firm of Lea, Peters & Co., dealers in building materials.

• **James M. Sampson,** for the past 11 years engineer in charge of foundry processes and developments in the works laboratory of General Electric Co., Schenectady, N. Y., died recently at Niagara Falls, N. Y., aged 63 years. He was graduated from Carnegie Institute of Technology in 1908 and before entering the employ of General Electric in 1921 was foundry superintendent of the St. Louis Steel Co., metallurgical engineer in the United States Bureau of Mines, and for several years foundry superintendent of the Watertown Arsenal.

THE LATE Lewis E. Saunders, vice-president of the Norton Co.

• **William I. Sivitz,** manager of the Pittsburgh office of the Duriron Co., Dayton, Ohio, died suddenly in Pittsburgh on Jan. 30. He had been identified with the company since 1929. He had recently been elected president of the Pittsburgh chapter of the American Institute of Chemical Engineers. He was a graduate of Carnegie Institute of Technology.

• **Edgar M. Cole,** traffic manager of American Cast Iron Pipe Co., Birmingham, died at Birmingham Feb. 5, aged 55 years. A native of Nashville, Tenn., Mr. Cole was associated with Continental Gin Co., Birmingham, as traffic manager before becoming traffic manager of American Cast Iron Pipe Co. in 1918.

• **Fred W. Behling,** president of the Kagel Brass Foundry Co., Milwaukee, died Feb. 11 at his home in Milwaukee after a long illness at the age of 68 years. Born in Germany, he went to Milwaukee with his parents at the age of 11. He had been in the brass business for 20 years and president of the firm for the last 10.

• **John T. Ryan,** aged 57, president, Mine Safety Appliances Co., Pittsburgh, died Feb. 20 in Miami, Fla. During his entire business life he was actively identified with the mining industry. After graduation from the Pennsylvania State College in 1908 he became affiliated with Rocky Ridge Coal Co. and later was superintendent and mining engineer for Langdon Coal Co. of Huntingdon, Pa.

From 1911 to 1914 he was in charge of the mine rescue and safety, and mine lamp testing division of the U. S. Bureau of Mines. In 1914 he and George H. Deike founded the Mine Safety Appliances Co.

In 1915 Mr. Ryan worked with Thomas A. Edison in the inventor's laboratory in New Jersey on the design and development of the Edison safety cap lamp.

• **Paul E. McKinney,** metallurgical engineer on the central staff of the operating vice-president, Bethlehem Steel Co., died at his home after a brief illness on Feb. 18, aged 56 years. Mr. McKinney was widely recognized as an authority on the metallurgy and production of steel for ordnance. Before his affiliation with Bethlehem Steel Co. in 1929, he was superintendent of the forge and foundry divisions of the United States Naval Gun Factory in Washington, where he had served in various capacities since 1906. Prior experience included work as assistant chief chemist, Reading Iron Co., and chemist, Warwick Iron & Steel Co.

• **Samuel R. Hoover,** former assistant general sales manager of Carnegie Steel Co. until his retirement in 1935, died Feb. 19 at Cleveland, at the age of 63 years.

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

	Feb. 25 1941	Feb. 18 1941	Jan. 28 1941	Feb. 27 1940
Flat Rolled Steel:				
(Cents Per Lb.)				
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Tin and Terne Plate:				
(Dollars Per Base Box)				
Tin plate	$5.00	$5.00	$5.00	$5.00
Manufacturing ternes	4.30	4.30	4.30	4.30
Bars and Shapes:				
(Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Wire and Wire Products:				
(Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails:				
(Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel:				
(Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$24.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Wire Rods and Skelp:				
(Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

	Feb. 25 1941	Feb. 18 1941	Jan. 28 1941	Feb. 27 1940
Pig Iron:				
(Per Gross Ton)				
No. 2 fdy., Philadelphia	$25.84	$25.84	$25.84	$24.84
No. 2, Valley furnace	24.00	24.00	24.00	23.00
No. 2, Southern Cin'ti	24.06	24.06	24.06	23.06
No. 2, Birmingham	19.38	19.38	19.38	19.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	23.00
Basic, del'd eastern Pa.	25.34	25.34	25.34	24.34
Basic, Valley furnace	23.50	23.50	23.50	22.50
Malleable, Chicago†	24.00	24.00	24.00	23.00
Malleable, Valley	24.00	24.00	24.00	23.00
L. S. charcoal, Chicago	30.34	30.34	30.34	30.34
Ferromanganese‡	120.00	120.00	120.00	100.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.

	Feb. 25 1941	Feb. 18 1941	Jan. 28 1941	Feb. 27 1940
Scrap:				
(Per Gross Ton)				
Heavy melt'g steel, P'gh.	$21.00	$21.00	$21.50	$17.25
Heavy melt'g steel, Phila.	20.00	20.00	20.00	17.25
Heavy melt'g steel, Ch'go	19.25	19.25	19.75	15.625
Carwheels, Chicago	20.25	20.25	20.75	17.25
Carwheels, Philadelphia	23.00	23.00	23.00	20.25
No. 1 cast, Pittsburgh	22.25	22.25	22.25	18.25
No. 1 cast, Philadelphia	23.75	23.75	23.75	20.25
No. 1 cast, Ch'go (net ton)	19.75	19.25	18.75	14.25
Coke, Connellsville:				
(Per Net Ton at Oven)				
Furnace coke, prompt	$5.50	$5.50	$5.50	$4.00
Foundry coke, prompt	5.75	5.75	5.75	5.25
Non-Ferrous Metals:				
(Cents per Lb. to Large Buyers)				
Copper, electro., Conn.*	12.00	12.00	12.00	11.50
Copper, Lake, New York	12.00	12.00	12.00	11.50
Tin (Straits), New York	53.00	51.75	50.15	48.50
Zinc, East St. Louis	7.25	7.25	7.25	5.75
Lead, St. Louis	5.50	5.50	5.35	4.85
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

*Mine producers only.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 123-132 herein.
On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Composite Prices

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Feb. 25, 1941	2.261c. a Lb.	$23.45 a Gross Ton	$20.08 a Gross Ton
One week ago	2.261c. a Lb.	$23.45 a Gross Ton	$20.08 a Gross Ton
One month ago	2.261c. a Lb.	$23.45 a Gross Ton	$20.42 a Gross Ton
One year ago	2.261c. a Lb.	$22.61 a Gross Ton	$16.71 a Gross Ton

	High	Low	High	Low	High	Low
1941					$22.00, Jan. 7	$20.00, Feb. 11
1940	2.261c., Jan. 2	2.211c., Apr. 16	$23.45, Dec. 23	$22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.286c., Jan. 3	2.236c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.512c., May 17	2.211c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.236c., May 28	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on averages for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Summary of the Week

• Mandatory priorities on machine tools and aluminum may be followed in other products . . . Rationing of some steel products becomes more strict . . . steel buying extends into third and fourth quarters . . . Rise in British orders expected to complicate tight situation further.

FINAL recognition at Washington that civilian requirements must give way to the National Defense Program replaces the policy heretofore pursued that there should be little or no interference with the country's normal activities.

Insofar as possible the former policy will be continued, but the exigencies of the situation with respect to machine tools and some of the non-ferrous metals have forced mandatory priority action that had hitherto been avoided by the voluntary cooperation method.

In steel the use of mandatory priorities has not yet been considered necessary, though some steel products are now subject to a form of rationing, notably structural shapes, stainless and other nickel alloy sheets, and all galvanized products. A meeting was held in New York on Monday to canvass the situation in plates, in which mills hold backlogs amounting to five or six months' production or more, and another meeting was held Tuesday to consider tungsten high speed tool steel, in which the tungsten supply is the primary factor.

ALTHOUGH mandatory priorities have thus far been applied only to machine tools and aluminum by the OPM Division of Priorities, similar action may be taken with regard to zinc, nickel and tungsten if the situation in these metals becomes more critical. Conservation of manganese ore is recommended by the OPM Division of Production through the greater use of spiegeleisen, which can be produced from domestic ores.

Tension in the Far East has directed fresh attention to tin, in which there has been considerable activity accompanied by rising prices. Although the tin supply in the United States is estimated to be sufficient for 15 months, conservation steps would immediately be taken in the event of stoppage of shipments from the Far East. The automobile industry and other consumers are now studying the substitution of other products. The question of substitutions, however, has its disadvantages, as in the case of collapsible tube manufacturers, who substituted aluminum for tin, at considerable expense for equipment, only to be forced back to tin when aluminum became scarce.

THE rate at which steel orders are being received indicates to the steel companies that they may be entirely sold out for the year by May 1. On most products books are almost completely filled for the second quarter and there have been large bookings for the third quarter and some for the fourth quarter. The question of making short deliveries even for defense projects thus becomes an intricate one of schedule adjustment, the inevitable result being broken delivery promises to regular customers. Thus there are some steel people who would welcome mandatory priorities as a way out of their difficulties, although others are equally opposed.

Railroad car builders, who have recently booked considerable business, may be cited as an example of the difficulties encountered in placing additional steel orders for any nearby delivery. Some of them have found it virtually impossible to obtain shipments desired by April or May. No priority has been accorded railroad equipment.

Into this already over-crowded steel situation a large volume of orders for the British will be dumped as soon as the lease-lend bill has been passed. January shipments fell short of 350,000 tons compared with 600,000 tons a month that Britain was expected to take. Hence, a large expansion of British orders is expected exclusive of contracts placed in the United States for fabricated products.

DESPITE the utmost efforts of the steel companies to maintain high production, the average for the industry, at 97 per cent this week, is only one point above last week. A threatened strike at Buffalo, should it occur, would bring a downturn in the industry average.

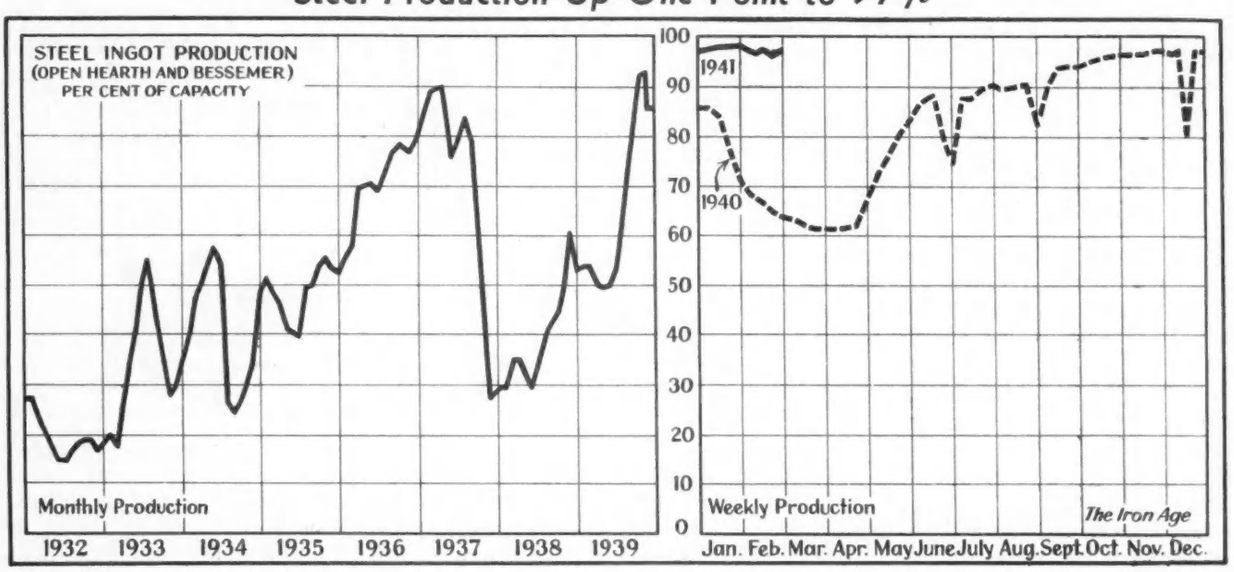
Steel plants in the Pittsburgh, Chicago, Youngstown and Buffalo areas are now facing a possible scrap shortage. Supplies are not coming out as freely as needed. Some small dealers are said to be more attracted by profit possibilities in non-ferrous metal scrap and are neglecting iron and steel scrap. Prices of steel grades are virtually stationary, but cast grades, borings and turnings are higher in some districts. In Canada the government has taken complete control over scrap and has fixed a price of $18, Hamilton, Ont., and Montreal for No. 1 heavy melting steel, with differentials for other grades. THE IRON AGE scrap composite price is unchanged at $20.08.

The Industrial Pace . . .

HEAVIER ACTIVITY in the automobile and engineering construction industries raised THE IRON AGE index of capital goods activity 1.3 points to 125.3, as compared with 124.0 in the previous week, 127.0 in the week ended January 25, and 85.6 in the corresponding week of 1940. Car assemblies rose to 129,240 from 127,510, comparing with 102,670 in the comparable week of 1940. Heavy construction was up from $96,346,000 to $126,113,000. The steel ingot production series was off slightly because of strikes and repairs to furnaces. Activity at Pittsburgh and lumber carloadings were up fractionally.

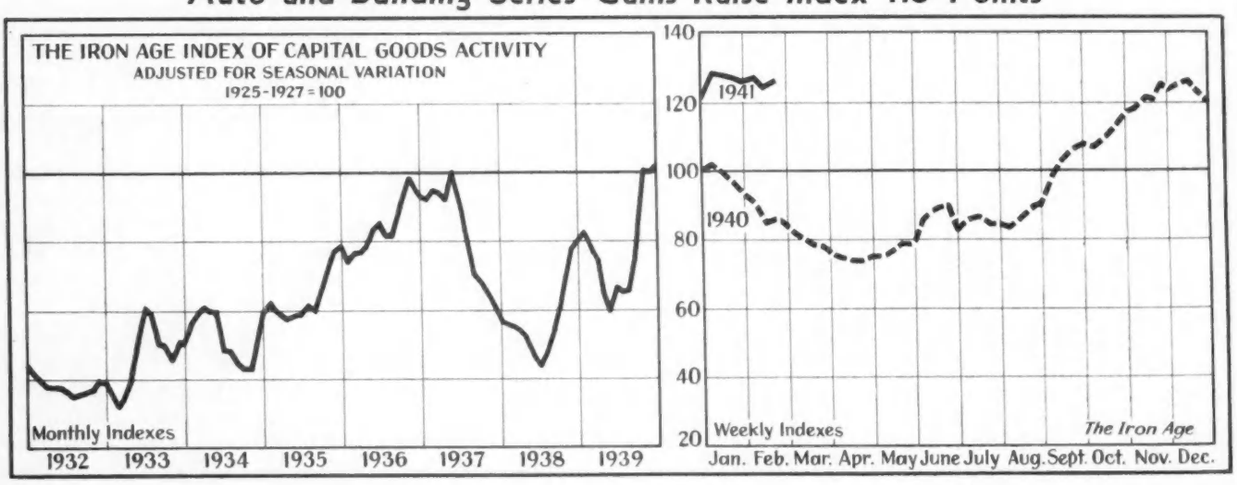
CONSUMPTION of Lake Superior iron ore by furnaces in January established a new all-time high of 6,331,018 gross tons, comparing with the previous record peak in December of 6,173,038 tons, and 5,289,308 tons in January, 1940. After declining $2 in seven weeks, The Iron Age scrap composite stood at $20.08 in the past week, up 8c. from the previous week due to adjustments in a major district. The index measuring prices of metals and metal products was 97.8 for the week ended February 8, unchanged since the week ended December 21, when it rose 0.2 points.

Steel Production Up One Point to 97%



District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	West-ern	St. Louis	East-ern	Aggre-gate
Current Week	98.0	99.0	97.0	98.0	93.0	104.5	85.0	100.0	105.5	99.5	102.5	105.5	92.5	97.0
Previous Week	98.0	95.5	91.0	98.0	89.0	104.5	85.0	100.0	94.0	109.0	102.5	105.5	108.0	96.0

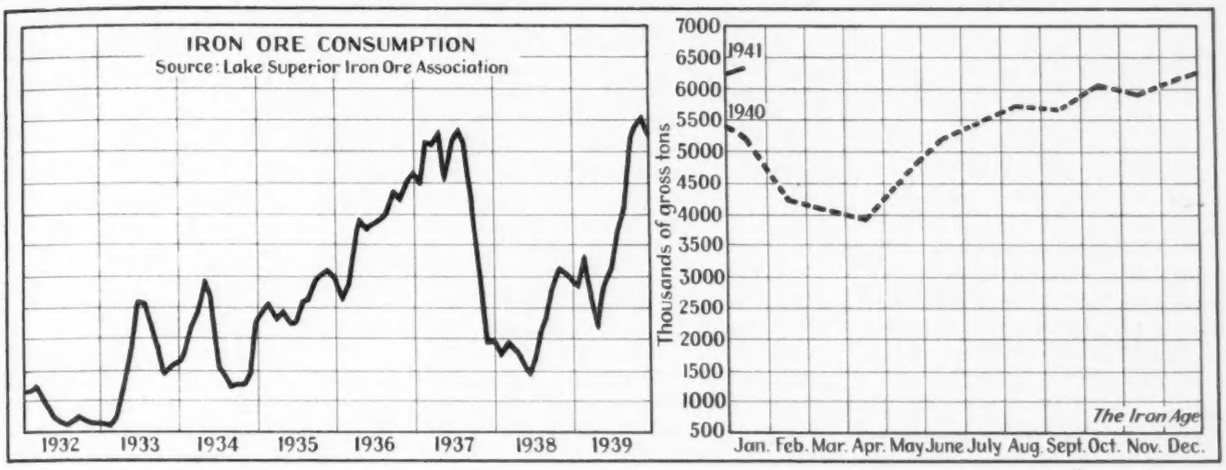
Auto and Building Series Gains Raise Index 1.3 Points



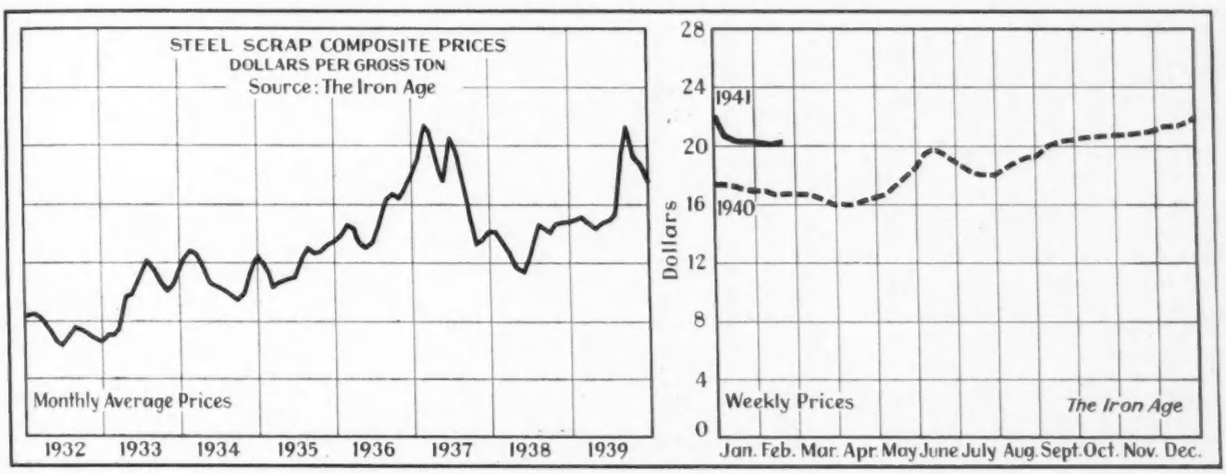
Component — Week Ended ➤	Feb. 22	Feb. 15	Jan. 25	Feb. 24 1940	Feb. 23 1929
Steel ingot production[1]	129.9	130.1	135.3	88.7	117.0
Automobile production[2]	136.6	134.7	130.5	108.6	129.1
Construction contracts[3]	158.6	154.5	161.4	78.2	132.7
Forest products carloadings[4]	73.7	73.2	79.3	57.0	116.9
Pittsburgh output and shipments[5]	127.9	127.7	128.4	95.4	116.3
COMBINED INDEX	125.3	124.0	127.0	85.6	122.4

Sources: [1] THE IRON AGE; [2] Wards Automotive Reports; [3] *Engineering News-Record*; [4] Association of American Railroads; [5] University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended Feb. 15. Other indexes cover week of Feb. 22.

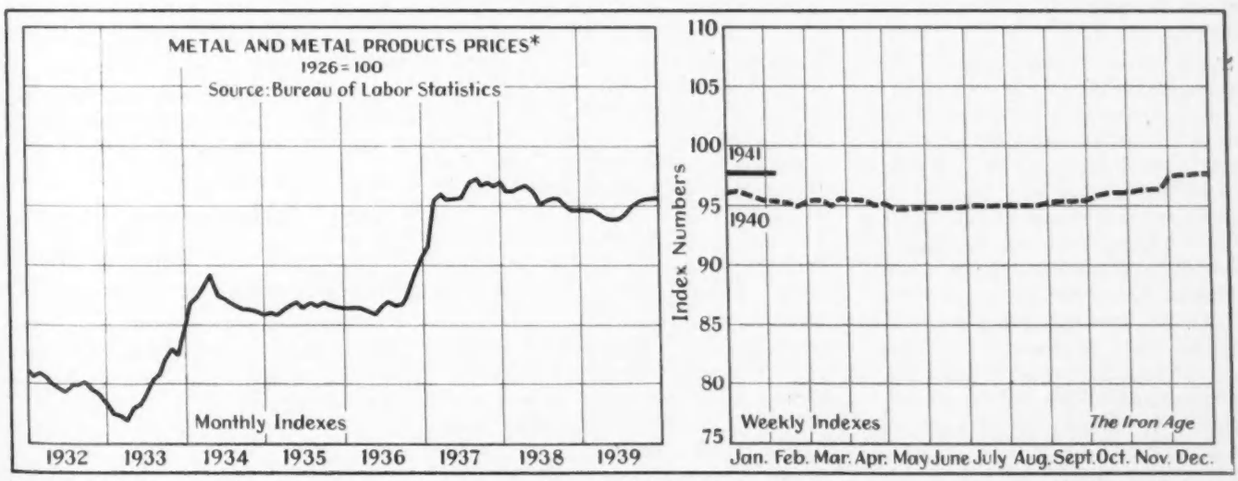
Ore Consumption In January Reaches New All-Time Peak



Steel Scrap Composite Levels Off After Decline Of $2



Metal Prices Unchanged At 2.4 Points Above 1939 Level



* Based on 147 items, including iron and steel, non-ferrous metals, and finished products as agricultural equipment, automobiles, tools, bolts, etc.

Market News

. . . THE WEEK'S ACTIVITIES IN IRON AND STEEL

New Business

. . . Incoming orders have run from 20 to 60 per cent over shipments

Four independent surveys, including one by THE IRON AGE, indicate, upon the assumption that the British will be in the war during all of 1941, a consumption of steel products this year running from 81,000,000 to 84,000,000 net tons of ingots.

Three of the surveys fairly well agree on 83,000,000 tons of steel ingots to be needed for the full year, 1941. Such a rate of consumption would require a steel ingot production output at current levels during the remainder of this year.

The greatest gains are expected to be made by the machinery, oil, gas and water, railroad, construction, and shipbuilding groups. It is believed that part of these estimated gains allow for increased activity in these groups because of indirect national defense requirements. The largest increase is expected to take place in export steel business which some sources believe will be fully 50 per cent over 1940 steel exports.

Incoming orders for the past several months have been running from 30 to 40 per cent in excess of production but this margin over and above actual shipments probably represents an amount of forward buying necessary to assure a steady flow of material in order to meet consumption requirements.

Steel inventories have been given considerable attention recently but opinions are as varied as the number of sources expressing them. An arithmetical average of the number of days' steel on hand, even though properly weighted and given as a consumer industry figure, would have little value today. The deviation from this average among the various groups would probably be substantial but would not show up in the final figure. Some large steel consumers who, it was thought, had substantial stocks of steel, do not appear to have more than 30 to 45 days' supply at present consumption rates. On the other hand, some small consumers have more than this amount.

Explanation of this might be that larger steel consumers have had unexpected defense demands placed upon them while some of the smaller consumers have yet to meet these requirements but will, if conditions continue as they are, be faced with national defense orders.

It is admitted that physical volume of steel inventories is greater than a year ago but on the basis of higher operations at steel consumer plants, it is said that current steel inventories would last only slightly more than half as long as a year ago when operations were at a lower level.

PITTSBURGH finds no slowing up in new business and reports February sales will run from 15 to 25 per cent ahead of January bookings. While some orders are being turned down, as a rule, specifications will be accepted if the consumer is satisfied with delivery promises made. As in other districts, fresh stainless steel business is being turned down as all nickel steels are being reserved for national defense or British use. It is understood commitments already made will be met. Steel makers may face another problem due to substitutions necessary to conserve certain non-ferrous metals in line with the national defense program. In many cases the substitutions will be steel, which will place an additional load on the steel industry.

Intensified demand for deliveries is noted at CLEVELAND and YOUNGSTOWN. Each week it is becoming more difficult for consumers to place new orders for reasonably prompt shipment. At the same time it is estimated that the preponderant majority of users in the two districts hold less than 30 days' supply of steel.

Zinc supplies for second quarter steel production are a source of concern. The nickel situation has already forced some stainless steel users to adopt substitutes. Tungsten, tin and low carbon ferrochrome also are none too plentiful.

Due to the nickel situation, very brisk demand for nickel scrap has arisen recently, particularly from foundries. Prices are reported rising swiftly.

A Chicago mill has been getting orders at a rate 60 per cent ahead of shipments. Others report new business gains from 15 to 20 per cent ahead of the previous month. The result is mounting backlogs and lengthening deliveries. Without exception, all products are active, one producer even being out of the tin plate market now. All alloys are extremely difficult to promise. Automotive and railroad buying are at strong levels. Nondefense customers are pressing for delivery on orders, some of which were placed last fall.

British purchases of steel in January and February fell considerably below the mark set by the British Purchasing Commission last fall. It had been expected that close to 600,000 tons of steel would be shipped during each of the first three months of 1941. January shipments, however, fell short of 350,000 tons and it is believed that February will be even less than that. Some sources expect a tremendous expansion in British buying after the lease-lend bill is passed but there are others who insist that the step-up in buying will not be substantial because it is said the British might change their own steel exporting habits.

Inquiries for steel from other countries are numerous, but many of them go unsatisfied because of the inability of mills to take orders for reasonably early delivery. Owing to the zinc situation, export prices of galvanized pipe have been advanced $6 a ton. Export merchants are offering premiums on various products. Many of these have been paid in amounts ranging from $4 to $9 a ton.

Steel Operations

. . . Rate for industry moves up one point to 97 per cent

Recovering from a slowing down in ingot output caused by strikes and breakdowns, the industry is operating this week at 97 per cent, one point above last week. A strike threat at the Bethlehem plant at Buffalo makes it impossible to

forecast the immediate future of steel production.

Pig iron production recently has been pretty close to the limit. A number of stacks are known to be nearly ready for relining and repairs, while idle capacity either does not offer much potential tonnage or lacks raw material. The pig iron situation is particularly tight in portions of the East and South.

It is estimated that around 90 per cent of the long idle beehive capacity is now engaged.

Pig Iron

. . . Tightness in supply grows more noticeable

Tightness in the supply of merchant pig iron grows more noticeable. Furnaces which cater to the merchant trade continue to allocate available tonnages in such a way as to keep non-integrated steel mills and foundries supplied, but they are watching the situation closely in an effort to prevent excessive buying and building up of inventories.

Some consumers in the North who have depended on Southern iron to a large extent are apparently unable to obtain sufficient iron from the Birmingham district and have been shopping around for Northern iron.

It is evident that merchant iron will be harder to get as the year advances. Some inquiries for steel making iron are going begging in the Central district, but a meeting of minds on price may be one obstacle.

The Jones & Laughlin Steel Aliquippa works stack which was blown out three weeks ago for repairs is back in blast this week.

Reinforcing Steel

. . . New projects total 16,250 tons, awards 8600 tons

Reinforcing steel awards of 8600 tons include 2000 tons for a steel storage plant at Burns City, Md.; 1200 tons for an armory at Washington, and 1000 tons for the Gilmore housing project, Baltimore.

New reinforcing steel projects total 16,250 tons. The largest inquiries are 4000 tons for the Remington Arms ammunition plant at Denver; 2250 tons for the Los Angeles River improvements at Los Angeles; 1800 tons for a government dam at Norfolk, Ark.; 1600 tons for the Triborough Bridge Authority at Brooklyn; 1500 tons for a powder bagging plant in Clark County, Ind., for the Goodyear Engineering Corp., and 1200 tons for a flood wall between Portsmouth and New Boston, Ohio.

Structural Steel

. . . Awards rise to 33,525 tons, new projects 31,700 tons

Fabricated structural steel awards advanced to 33,525 tons from 23,850 tons last week. Sizable lettings are 9000 tons for an ordnance plant at Denver for the War Department; 3200 tons at Cleveland for the Thompson Products plant; 3000 tons for an ordnance plant at Childersburg, Ala., for E. I. du Pont de Nemours & Co.; 2700 tons for storage buildings at Burlington, Iowa; 2240 tons for bridges at Fort Edward, N. Y., for the Delaware & Hudson railroad; 2100 tons for additions and alterations to the crane runway for the Cramp Shipbuilding plant, Philadelphia; 1800 tons for a power plant extension at Burlington, N. J., for the Public Service Electric & Gas Co., and 1150 tons additional at Lake City, Mo., for the Remington Arms ordnance plant.

New structural steel projects of 31,700 tons are also higher. New inquiries include 5000 tons at Indianapolis for a precision instrument plant for the Navy; 4500 tons for flood protection work at Massillon, Ohio, for U. S. Engineers; 4000 tons at Quincy, Mass., for extensions to shipways at the Bethlehem Fore River Shipbuilding plant; 4000 tons at Narrows, Va., for the Celanese Corp. plant extension; 2000 tons, including H piles, for shipways for the Sun Shipbuilding Co., Chester, Pa.; 1500 tons at Marysville, Mich., for a boiler house and turbine room extension for the Detroit Edison Co.; 1200 tons for the Nordberg Mfg. Co. plant addition, Milwaukee; 1100 tons for an apartment house in New York for L. Victor Weil, and 1037 tons for the Los Angeles River improvements at Los Angeles.

Tubular Goods

. . . Recent improvement in orders continues

Pittsburgh reports no abatement in strong tubular goods demand. Oil country requirements in some instances are running 20 per cent ahead of a month ago. Miscellaneous line pipe orders are in much greater volume than a month ago and the upward trend is still in evidence in merchant pipe sales.

CLEVELAND and YOUNGSTOWN producers report order backlogs still growing on all types of pipe. Buttweld has shared in the gains, electric weld mills are heavily booked and delivery promises on line pipe from some mills are well extended. Seamless operations in the Valley, which suffered slightly from the short strike in mid-February, are back to normal.

Cast iron pipe manufacturers at BIRMINGHAM are being placed in a better competitive position on exports to South America, Central America and Mexico by the war's effects on producers in Germany, England and France.

Shipbuilding

. . . Work on 200 cargo ships to be started soon

• • • **Construction of** 200 standard emergency 7450-ton Maritime Commission cargo ships will require about 600,000 tons of rolled steel, mostly plates, the equivalent of approximately 900,000 ingot tons. The first ships are expected to be ready for service before the end of the present year but the building program will not be completed until the end of 1942 or early in 1943. Steel shipments will be started in March or April.

The contract cost of the ways and other facilities was $33,374,500. The cost at each of the seven affected plants follows: Oregon Shipbuilding Co., Portland, Ore., $4,787,000; California Shipbuilding Co., Los Angeles, $4,766,000; Houston Shipbuilding Co., Houston, Texas, $4,680,000; Alabama Dry Dock & Shipbuilding Co., Mobile, $1,322,000; North Carolina Shipbuilding Co., Wilmington, N. C., $5,140,000; Bethlehem-Fairfield Shipyard, Baltimore, $7,838,000; Louisiana Shipbuilding Co., New Orleans, $4,841,000.

Fifty ships will be built at Baltimore, 31 each at Portland and Los Angeles, 25 each at the New Orleans, Houston and Wilmington plants and 13 at Mobile.

The Navy Department last week awarded $13,183,190 in contracts to 16 companies for the expansion of shipbuilding facilities and for necessary expansion in the production of parts for ships. These companies received contracts:

Quimby Pump Co., Inc., Newark, N. J., $134,000; DeLaval Steam Turbine Co., Chambersburg, Pa., $661,000; Henry B. Nevins, City Island, N. Y., $100,000; Worthington Pump & Machinery Corp., Harrison, N. J., plant, $600,000; Buffalo plant, $325,000; Wellsville, N. Y., plant, $100,000; Lake Washington Shipyards, Houghton, Wash., $700,000; American Tool Works Co., Cincinnati, $740,571.71; Consolidated Machine & Tool Corp., Rochester, N. Y., $490,000; Monarch Machine Tool Co., Sidney, Ohio, $500,000; Sterling Engine Co., Buffalo, $450,000; Birdsboro Steel Foundry Machine Co., Birdsboro, Pa., $600,000; Moore Dry Dock Co., Oakland, Cal., $4,000,000; Kollmorgan Optical Co., Brooklyn, $307,000; Camden Forge Co., Camden, N. J., $3,125,619.

The original agreement with Camden Forge Co., made on Oct. 9, 1940, was for $2,873,695. That amount is included in the contract figure carried above.

Railroad Buying

. . . Inquiries issued for 5600 freight cars and 80 locomotives

New orders reported this week total 452 freight cars and 17 locomotives. Inquiries and budget schedules, however, amount to some 5600 freight cars and 80 locomotives. In Canada an order of 825 freight cars has been placed.

Thailand railroads have placed an order for 350 freight cars with the Magor Car Corp. in addition to 500 placed recently.

Lake Superior and Ishpeming bought 100 50-ton ore cars from Bethlehem Steel Co. for use in the Bethlehem, Pa., plant. Bethlehem is building two 200-ton heavy ingot transfer cars.

New York, New Haven & Hartford has bought 10 diesel-electric 660-hp. switching locomotives from the American Locomotive Co.

The Navy will receive bids for three diesel-electric 45-ton engines on March 4, and four 180-hp. diesel locomotives for Western and Eastern yards are being built by the Vulcan Iron Works. The Panama Railroad bought three 5-ft. gage oil-burning locomotives from the H .K. Porter Co.

Heisler Locomotive Works has sold three fireless locomotives to New England industrial plants.

Canadian Pacific is reported to contemplate the purchase of 50 locomotives, half of the 4-6-2 and half of the 4-8-4 type. Canadian National is similarly in the market for 25 4-8-4 engines. The road is

building 100 refrigerator cars in Winnipeg. Also 250 hoppers were bought from the Eastern Car Co., 150 ballast and 125 ore cars from the National Steel Car Corp., and 200 flat cars from the Canadian Car & Foundry Co.

Baltimore & Ohio is expected to buy 2400 freight cars and four 4000-hp. diesel-electric passenger locomotives, as approved by the board of directors.

Chicago, Burlington & Quincy has asked bids on 1500 box cars, 225 automobile cars and 200 all-steel hopper cars.

Chicago, St. Paul, Minneapolis & Omaha is asking for estimates on 700 50-ton box cars, and the Central of New Jersey is asking for court authority to build 600 freight cars in own shops.

According to release by the Association of American Railroads, on Feb. 1, 1941, more new freight cars were on order than at any time during the past 15 years. These totaled 41,600, compared with 35,702 on Jan. 1 this year and 34,559 on Feb. 1, last year. Class 1 railroads had furthermore 238 locomotives on order, of which 120 were steam and 118 electric and diesel engines.

Merchant Bars

. . . Alloy material difficult to obtain

February tonnages will be in excess of January bookings. Demand at PITTSBURGH is widely miscellaneous and available material is being closely allocated. CHICAGO mills are producing bar items at breakneck speed. Alloy bars are increasingly difficult to get. CLEVELAND reports that some sellers are restricting acceptance of galvanized bar orders because of zinc shortages. Bars with nickel content are virtually impossible to obtain without preference ratings of high standing.

Plates

. . . Meeting of producers held to canvass situation

A meeting of representatives of the plate mills was held in New York on Monday to canvass the plate situation with respect to determining what is essential and what is not. S. S. Stratton, assistant director of the Minerals and Metals Priorities Division, presided. The heavy bookings of plates, which extend for five or six months or longer, has created a tightness wherein short deliveries are difficult to arrange even for defense projects.

One buyer of plates in the CLEVELAND territory, upon accepting a promise of August delivery, said that considerable shopping around had failed to bring better promises. Expansion of plate mill production facilities which would assist the national defense program is reported being considered by one of the CLEVELAND producers.

CHICAGO steel mills report that railroads are putting more pressure on for steel. Deliveries in most plate sizes have moved back at practically all mills. Some shipbuilding purchases were reported last week—and that district be-

lieves more business will come from this source.

Mills in eastern Pennsylvania continue to select bookings from the flow of inquiries on the basis of consumers' past requirements. It is extremely difficult for unattached consumers to obtain delivery promises unless defense work is directly involved. Deliveries vary widely between mills but only very limited tonnages of certain grades are available before July. Direct government buying and heavy shipyard purchases have formed a considerable part of recent specifications.

Cold Finished Bars

. . . Jobbers and auto industry the largest buyers

Cold finished bar makers report a heavy influx of new business with jobber and automotive demand vying for first place. Jobber business has picked up substantially since the first of the year. Strong demand is also emanating from miscellaneous machinery makers.

Bolts, Nuts and Rivets

. . . Orders are running in excess of production

At Cleveland February incoming orders received by leading producers exceeded their output. It is expected that March and April will follow the usual pattern of seasonal buying, adding further weight to order backlogs.

Tin Plate

. . . Order volume and production gain

Not only has the steady flow of tin plate specifications been sustained in the past week, but there are ample signs that increases will be in order for several weeks to come. February bookings are substantially greater than those of January. Cold reduction tin plate mills are estimated to be running at 96 per cent, up three points from last week.

Semi-Finished Steel

. . . Strict allocation of supplies continues

Pittsburgh and other major market centers report no change in the semi-finished steel situation. Inquiries far outrun production and strict allocation of supplies is the general rule. More instances of exchange of products between integrated and non integrated mills continue to come to light.

Wire Products

. . . Incoming tonnage heavy . . . Specialties very tight

With incoming tonnage still heavy at CLEVELAND, drawing machine capacity is jammed and rod requirements are at a very high point. Nevertheless, the regular customers of CLEVELAND mills are being served for their actual needs on standard carbon wires and the defense program is getting fullest cooperation. Obtaining desired deliveries on galvanized, stainless and other alloy wires often is very difficult to arrange. Wire mesh for construction and road building projects continues in very great demand.

Wire rods lead the list at PITTSBURGH, where total wire sales for February will be in somewhat greater volume than those of January. Practically all wire departments are running to capacity with orders in excess of production.

Sheets and Strip

. . . Second quarter well filled, orders booked for third and fourth

Despite the large tonnages of flat roller material moving to automotive makers, PITTSBURGH reports demand from that source even greater than a week ago. While automobile makers are building up a stock of finished cars to meet any emergencies which might occur later in the year, there is no evidence that the motor car industry has unduly large stocks of steel. This opinion is amply corroborated by the influx of sheet and strip specifications. Specifications from other sheet and strip users are as heavy as mills will permit. Little or no tonnage can be booked for second quarter and in some instances third quarter order books are fairly well filled, at least in the hot rolled sheet category.

Pressure for deliveries remains intense at CLEVELAND and YOUNGSTOWN where daily mill output is often above expectations. Among the current heavy inquiries can be seen numerous instances where light flat rolled steel is being sought for applications formerly filled by heavy steel, stainless, or non-ferrous metals which now are difficult to obtain readily. Demand for black sheets for export continues to be exceptionally heavy. For its requirements several months in the future the auto industry recently has been placing large orders. One miscellaneous sheet consumer at the start of this week sent commitments for November delivery to a CLEVELAND sales office.

Coated sheets are tighter in CHICAGO. So, too, with specifications calling for nickel. One large order involving this ingredient made the rounds last week before a mill could be found to handle it. Extremely heavy automotive demand in that district has been a factor in lengthening deliveries. One producer moved back strip mill sizes, and galvanized, hot rolled and cold rolled sheets all by two weeks.

Sheet mills in SOUTHERN OHIO have apportioned rolling schedules to accommodate consumer demand, with orders steadily rolling in. Business continues to flow into the district at a better than capacity rate, with first quarter books definitely filled and second quarter books almost so. A fair quantity of third quarter delivery is being received and one interest reports that some consumers have made commitments to the end of the year.

Demand at EASTERN PENNSYLVANIA mills continues far above producers' desire to book orders and production. Backlogs still climb and delivery promises, when available, are scattered throughout the third quarter, with most of the tonnage falling in July and August. Hot-rolled material is in the tightest position with cold-rolled not far behind. The district's largest consumer is having difficulty in filling its requirements.

Export Licensing Extended

Washington

• • • **Beryllium,** graphite electrodes, and aircraft pilot trainers were subjected to the requirements of the export licensing control system under a proclamation issued by President Roosevelt on Monday. The restriction became effective upon issuance of the order.

Non-Ferrous Metals

. . . MARKET ACTIVITIES AND PRICE TRENDS

New York, Feb. 25—Results of a questionnaire sent to copper consumers and made known during the past week indicate a possible shortage of roughly 100,000 tons of copper during the months of March and April, in spite of the planned release of 50,000 tons by the Metals Reserve Co. which will be used to supplement domestic production in that period. Probable solution would be the purchase of an additional 100,000 tons by that agency, a considerable part of which is expected to be fire-refined metal already in the country. Following an extreme spurt of activity in tin in the middle of last week all nonferrous markets took on a fairly quiet tone. Zinc and copper producers continued to allocate supplies with the aid of advisory committees, while interest in the lead market remained on a moderate scale.

In the copper market custom smelters were only moderately active in the week as consumers waited to learn more about possible additional government purchases. Business for March and April delivery was done on the basis of 12.50, unchanged from the previous week. Mine producers doled out supplies on the basis of 12c., delivered Valley. Export inquiry was quiet with the market quoted at 10.50c., f.a.s.

Lead

Stocks of refined lead in January rose to 47,248 tons, an increase of 6322 tons, as the result of an increase in production from domestic ores of 7450 tons. Shipments in January totaled 55,711 tons, a decrease of 1044 tons from the 56,755 tons shipped in December. The higher stock position and lower domestic shipments resulted from a more extended use of foreign lead to fill requirements while conserving limited domestic supplies. The market was moderately active today, involving principally carload lots, following a week in which sales were about 15 per cent heavier. Consumers have filled their March needs to the extent of about 75 to 80 per cent and appear satisfied for the most part with their positions.

Zinc

Of greatest moment to the trade at the present time is the question of whether the government will consider it necessary to resort to formal priorities. So far, the naming of a committee last week to act as an advisory body on the allocation of supplies has been deemed sufficient. The problem of non-defense users of zinc of determining substitutes, as suggested by the government, grows more pressing as an increasing bulk of supplies is conscripted for direct defense work. At the same time the resulting possibility of a restricted market for zinc following the present emergency is causing producers some concern. Both sales and shipments showed a decline in the past week, the former to the very low total of 900 tons, while deliveries were 4600 tons. Correspondingly, backlogs fell to 109,000 tons.

Tin

Increased apprehension on the part of consumers over developments in the Far East led to extremely heavy buying in the domestic market in the past week, with the result that prompt and nearby supplies were left strictly limited. Prompt Straits metal rose rapidly to 54.25c. a lb., delivered New York, but, following a publicly expressed opinion by a government agency Thursday that higher prices could not help the situation, the price declined to 53c. Buyers immediately began to show less interest and activity fell off, although some March arrivals were sold for 52.75c.

(Non-ferrous prices on page 127)

Machine Tools

. . . SALES, INQUIRIES AND MARKET NEWS

Paper Work Greatly Increased

New York

• • • **Practically every dealer** organization has had to increase its clerical staff in recent months, particularly since so much buying has been for the account of the Defense Plant Corp. Not only must all invoices to this RFC unit be made out in quintuplicate, but every machine must bear a separate order number and separate invoice, even though 25 machines of identical size and make be ordered from the same source at the same time. Handling of government bills of lading has also proved cumbersome. Yet despite these added costs of doing business, dealers report instances where dealer commissions are being lowered or where pressure is being brought to bear in that direction.

Despite the fact that shipments are currently averaging about double the volume of the comparable period a year ago, new business continues to come in in even greater volume, so that backlogs of local dealers still mount. Shipments are being diverted away from buyers without priority ratings, except on machinery that has been especially tooled and would serve no other purpose. Delivery promises on new business are mostly into 1942. Deliveries on special gages are far ahead and ordinary stock machinists' measuring tools like micrometers can no longer be had off the shelf. With hand micrometers scarce, pilferage has become a serious problem, particularly in the smaller shops where plant protection is inadequate. Jobbing shops which have gage subcontracts are prominent in the current machine tool demand.

Sales and Output Strong

Cleveland

• • • **February is closing** with output at a very high level, not only in this vicinity but for the nation as a whole. At the same time, the sales picture continues strong, being enlivened by several very large new projects each of which will call for much equipment.

Local dealers are awaiting written confirmation of a vast amount of business which has been allocated verbally. The used machinery field seems to regard the recently announced price schedules as being generally fair. Opinion is divided as to whether the action will serve to bring onto the market any machines that might have been held for possible higher prices.

Word from some of the large aircraft plants indicates that startling changes in production practices are under way and more can be expected. The number of individual operations is undergoing a sharp reduction at some plants, all of which will greatly assist production. In a number of instances key machinery is still awaited, however.

Production Up 50 Per Cent

Cincinnati

• • • **Machine tool production** in this area has been increasing almost daily. A check of a number of key manufacturers during the past week indicates that present production rates run from 40 to 50 per cent greater than during last year, which indicates that the industry is definitely meeting its promise with the defense board to increase production. At the present rate of plant operations, production is now well in excess of last year's average, and is definitely above any previous operation rates of the industry. Some small diminution in the flow of orders was reported during the past week, but the trade generally feels that this is a temporary lull. Some comment was indulged that after the lease-lend bill was passed in Congress, a sharp increase in orders is probable. This is based upon the fact that all the government requirements have not yet been placed on order.

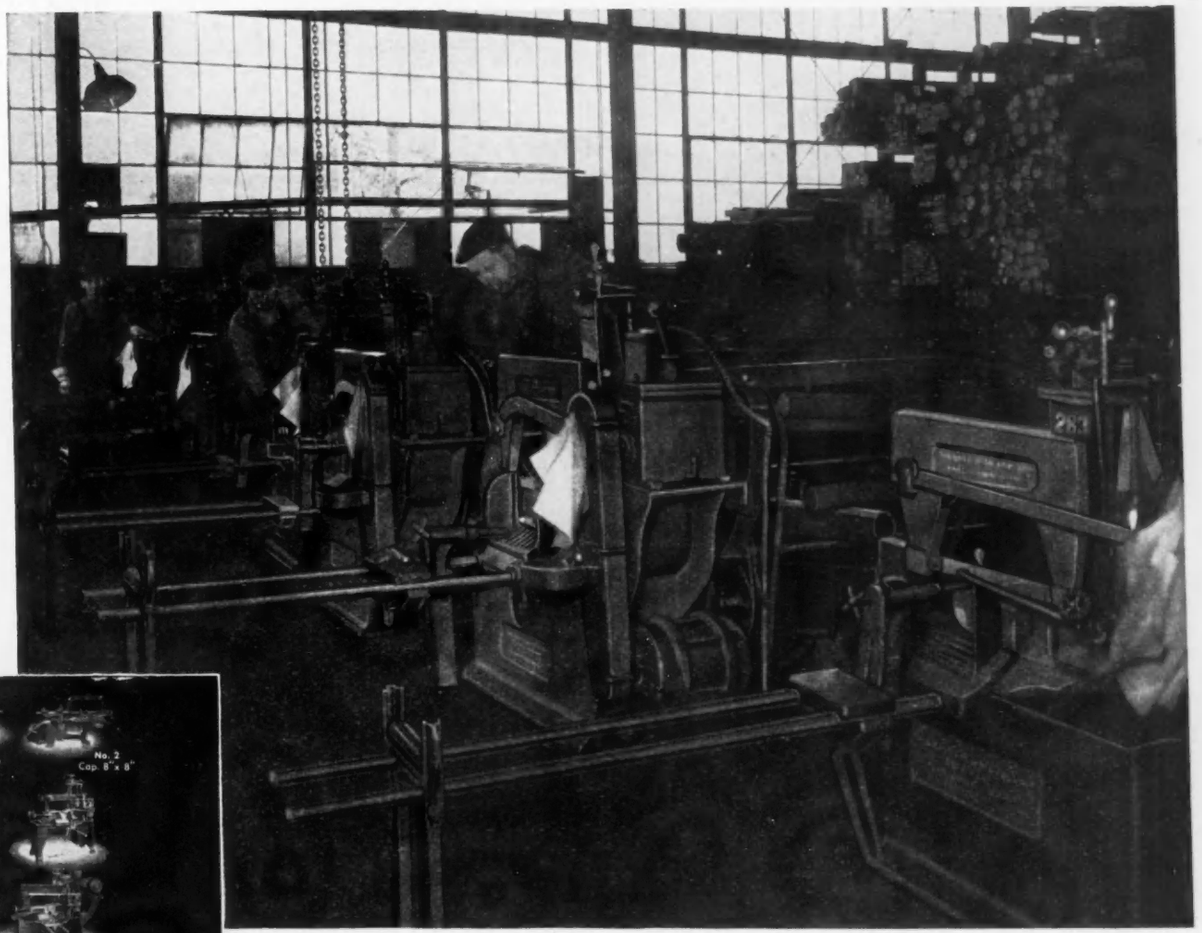
Few Affected by Priority Order

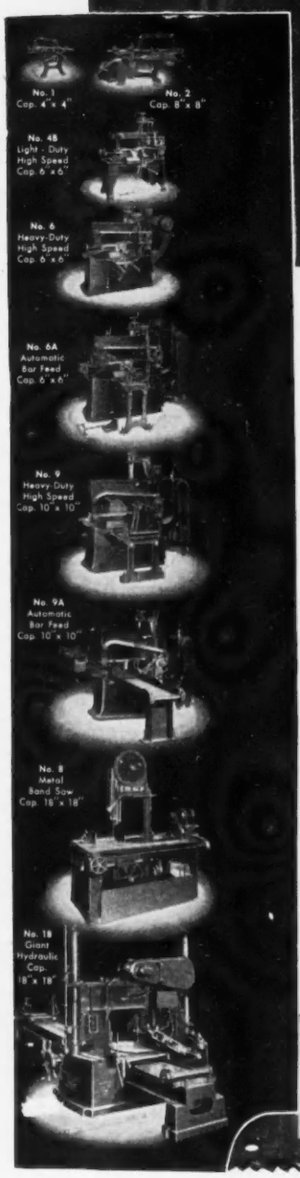
Chicago

• • • **In the aftermath** of the excitement following the order on machine tool priorities, consumers, dealers and manufacturers have found that the order actually has not seriously affected the situation. Since few, if any, customers can be found without priorities, the question has resolved itself to one of shifting deliveries to meet immediate needs, rather than one of seeking to establish priority ratings.

January Gear Sales At New All-Time Peak

SALES of industrial gears in January, excluding automotive gears and gears used in high speed turbine drives, were the highest for any month since the American Gear Manufacturers Association began compiling an index in 1928. The January index, 259, topped the previous high of 216, occurring in October, 1940, by 20 per cent, and was 25 per cent higher than the 208 recorded for December. The January, 1940, index, 123, was exceeded by 33 per cent. Previous to 1940 the all-time high was in March, 1937, when the index rose to 195. Average monthly index for the 13-year period from 1928 through 1940 was 89.8. In 1940 the monthly average was 155, the highest that interval.





No Bottleneck Here —with this battery of high speed automatic MARVEL Hack Saws

This battery of nine high speed MARVEL No. 9A Hack Saws, with automatic bar push-up, has solved the cutting-off problems of R. G. LeTourneau, Inc., Peoria, Ill.

Placed at the open end of the stock racks, they are used to cut-off single lengths or large numbers of identical pieces from ½″ to 6″ round bars, ¼″ flats in widths to 10″, and billets from 2″ to 10″ square. Built for continuous heavy duty operation. all-ball-bearing and exceedingly fast, they have kept pace with the rapidly expanding production schedule at the immense LeTourneau plant.

After more than 4 years of practically continuous night-and-day operation, Foreman R. C. Langhals sums it up with, "*Very* little trouble and good work." And, to that should be added: Faster than any sawing machines or other cutting-off method and extremely accurate—the most economical and efficient cutting-off tools available.

ARMSTRONG-BLUM MFG. CO. ***"The Hack Saw People"*** 5700 Bloomingdale Ave., Chicago, U.S.A.

MARVEL SAWS

Eastern Sales Office:
199 Lafayette St., New York

Scrap . . . MARKET ACTIVITIES AND QUOTATION TRENDS

• • • **While there** are few changes this week in the prices quoted for the major consuming centers, there is general complaint of scarcity of material. According to a number of Middle Western authorities queried recently, scrap is not coming out anywhere near the rate needed to support this year's expected record-breaking ingot production. Pittsburgh, Chicago, Youngstown and Buffalo apparently are in tight situations. In the Valley district, where around 70 cars per day are required at present, the incoming movement is just about half that amount. Scrap charges have been heavier by necessity in the Valley recently. If the 1941 level of ingot production of 81,000,000 to 84,000,000 tons net is to be attained, more than 90,000,000 tons of scrap and pig iron must be provided.

THE IRON AGE composite scrap price remains at $20.08 this week with unchanged quotations for No. 1 heavy melting steel at Pittsburgh, Philadelphia and Chicago. Steel grades are generally unchanged, while cast scrap with continued heavy demand shows price increases in many centers.

In Canada governmental steps have been taken to control prices and supplies completely. With a maximum price for No. 1 at Hamilton, Ont., and Montreal of $18, a complete system of differentials has been established.

Pittsburgh

To say that the scrap situation here is becoming serious is a strong understatement. Supplies are not coming out and, although the weather may have had something to do with this, it is believed to be playing a minor part. The moderate tonnage of No. 1 heavy melting steel purchased three weeks ago is by no means more than a quarter covered, even with dealers having offered the same price to cover as was paid by the consumer. Secondary grades of scrap are stronger, especially mixed borings and turnings and cast iron borings. Several blast furnaces, endeavoring to increase their yield of metal, have bought and are inquiring for moderate size tonnages. This action has necessitated the paying of higher prices in order to bring the material from points outside the district.

Philadelphia

No new elements tending to alleviate the anxiety of buyers about the currently inadequate flow of scrap to district mills are yet in evidence. Better weather has helped country shipments somewhat but the increase is not satisfactory. Cast scrap is the tightest and shows no signs of improvement. Mixed yard cast strengthened to $20.50 to $21 in the past week while other grades remained unchanged. Users of prime steel grades are accepting secondary grades in order to fill needs.

Chicago

Undeniably, the supply of scrap is getting tighter and tighter. The industry is mixed in its reactions as to the reason. Some contend that the actual supply is smaller, which opinion bears the weight of truth in the light of present conditions. Others argue that dealers in outlying districts are holding off, not deliberately but due to disinterest in the market. Foundry items are especially scarce, prices on these being strictly nominal since they are determined by the amount of available material. Large sales are conspicuous by their absence here—one car turnovers being about the average sale. The list, generally, this week experienced little change, a few items edging forward slightly, while No. 1 heavy melting steel remained unchanged at $19 to $19.50.

Youngstown

The scarcity of fresh supplies of iron and steel scrap has become more noticeable here during the past week. At the same time, the amount of scrap being consumed has risen sharply. Quotations are unchanged this week.

Cleveland

Scrap is more plentiful in this district at the present time than in other steel mill areas and one large consumer has temporarily curtailed incoming shipments. Railroads have been picking up very little scrap, however, and some scrap yards have eliminated one shift because of a combination of conditions. Cast iron scrap continues in very great demand. In recognition of the unusually high priced sale of blast furnace grades, these items are quoted higher this week.

Buffalo

There has been little activity in the market here in the last week. Bad weather and severe cold had reduced yard supplies to the point where dealers were fearful of shortages, but the situation was relieved earlier this week. Cast scrap has become very difficult to obtain. Shoveling turnings and low phosphorous plate have figured in some dealer sales and are both up 50c. over last week's quotation.

St. Louis

An east side mill bought an estimated 15,000 to 20,000 tons of heavy melting steel on the basis of prevailing prices, these and other prices are unchanged. The movement of scrap to this market continues fairly heavy.

Cincinnati

Dealers are adhering to government wishes in holding a ceiling over prices. Mills are taking all material that is available, although dealers report that available scrap tends to be restricted. In fact, the inability to get all the scrap necessary, has brought about consideration on the part of some consumers to use lower grades of scrap in order to cover all of their needs.

Birmingham

Uncertainty over the price situation reportedly is retarding flow of material into this district. Scrap being received is principally of the agricultural and automotive variety. Prices are unchanged.

Detroit

The past week has been one of minimum activity with attention concentrated on lists which were scheduled to close on Thursday and Friday of this week. Automotive production scrap continues at the unusually high winter level.

New York

The price situation has recently clarified to the extent that No. 1 steel is quotable at $16 to $16.50, and No. 2 at $15 to $15.50. Open weather has been helpful in bringing out accumulations and the market is active. Cast grades are not plentiful and brokers have lifted prices in an effort to draw out holdings.

Boston

For a majority of the usually most active kinds of scrap, prices are firmer, averaging about 25c. a ton higher, not because of any stepping up of movement but because of a tendency to hold material off the market. Cast continues the tightest thing on the list. Some No. 1 steel is going to eastern Pennsylvania at $14.65 a ton, f.o.b., and No. 2 steel at a dollar less. Arsenal, Watertown, Mass., is taking bids until Feb. 28 on 750 tons of steel and iron chips and turnings, 450 tons of steel and iron scrap, 125 tons brass and bronze chips and turnings, 14 tons of aluminum chips and turnings, and 10 tons insulated wire and cable scrap, a total of 1350 tons.

Toronto

The Steel Controller of Canada has taken full control of scrap prices and supplies, dating from Feb. 17, and has named a maximum price level of $18, either Hamilton, Ont., or Montreal for No. 1 heavy melting steel, with differentials for other grades. Details of the order are published on another page of this issue.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$21.00
Railroad heavy mltng.*	$21.00 to 21.50
No. 2 heavy melting*	20.00
Railroad scrap rails...	24.00 to 24.50
Comp. sheet steel.....	21.00
Hand bundled sheets.	19.50 to 20.00
Heavy steel axle turn.	19.50 to 20.00
Heavy steel forge turn.	18.50 to 19.00
Machine shop turnings	**15.50 to 16.00**
Short shov. turn. alloy free	17.00 to 17.50
Mixed bor. & turn.....	17.00 to 17.50
Cast iron borings.....	17.50 to 18.00
Cast iron carwheels...	23.00 to 23.50
Heavy breakable cast.	19.00 to 19.50
No. 1 cupola cast.....	22.00 to 22.50
RR. knuckles & coup.	26.00 to 26.50
Rail coil springs	27.00 to 27.50
Rail leaf springs	**27.00 to 27.50**
Rolled steel wheels....	27.00 to 27.50
Low phos. billet crops.	26.50 to 27.00
Low phos. punchings.	26.50 to 27.00
Low phos. heavy plate.	**25.50 to 26.00**
Railroad malleable ...	26.00 to 26.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	**$20.00**
No. 2 hvy. mltng. steel.	**18.50**
Hydraulic bund., new.	**20.00**
Hydraulic bund., old..	17.00
Steel rails for rolling..	$25.00 to 26.00
Cast iron carwheels..	**23.00**
Hvy. breakable cast..	**22.00 to 22.50**
No. 1 cupola cast	**23.50 to 24.00**
Mixed yard (f'd'y) cast	20.50 to 21.00
Stove plate (steel wks.)	**19.00 to 19.50**
Railroad malleable ...	23.50 to 24.00
Machine shop turn....	**14.50**
No. 1 blast furnace....	14.00
Cast borings	16.00
Heavy axle turnings..	**19.50**
No. 1 low phos. hvy...	26.00 to 26.50
Couplers & knuckles..	26.00 to 26.50
Rolled steel wheels....	26.00 to 26.50
Steel axles	25.00 to 25.50
Shafting	25.00 to 25.50
Spec. iron & steel pipe	18.00 to 18.50
Cast borings (chem.)..	16.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel.....	$19.00 to 19.50
Auto. hvy. mltng. steel alloy free	18.00 to 18.50
No. 2 auto. steel.....	16.00 to 16.50
Shoveling steel	19.00 to 19.50
Factory bundles	18.50 to 19.00
Dealers' bundles	17.00 to 17.50
No. 1 busheling	18.00 to 18.50
No. 2 busheling, old...	10.50 to 11.00
Rolled carwheels	22.25 to 22.75
Railroad tires, cut	23.00 to 23.50
Railroad leaf springs..	22.50 to 23.00
Steel coup. & knuckles	22.50 to 23.00
Axle turnings	18.25 to 18.75
Coil springs	24.00 to 24.50
Axle turn. (elec.).....	19.75 to 20.00
Low phos. punchings..	23.00 to 23.50
Low phos. plates 12 in. and under	23.25 to 23.75
Cast iron borings.....	14.00 to 14.50
Short shov. turn.....	14.00 to 14.50
Machine shop turn....	13.75 to 14.25
Rerolling rails	23.50 to 24.00
Steel rails under 3 ft..	23.00 to 23.50
Steel rails under 2 ft..	24.00 to 24.50
Angle bars steel	23.00 to 23.50
Cast iron carwheels...	20.00 to 20.50
Railroad malleable ...	23.50 to 24.00
Agric. malleable	17.50 to 18.00
	Per Net Ton
Iron car axles	$23.50 to $24.00
Steel car axles	24.00 to 24.50
Locomotive tires	18.00 to 18.50
Pipes and flues	14.00 to 14.50
No. 1 machinery cast..	19.50 to 20.00
Clean auto. blocks....	18.50 to 19.00
No. 1 railroad cast....	17.75 to 18.25
No. 1 agric. cast.....	**16.50 to 17.00**
Stove plate	13.75 to 14.25
Grate bars	14.00 to 14.50
Brake shoes	14.25 to 14.75

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$20.50 to $21.50
No. 2 hvy. mltng. steel	19.25 to 20.25
Low phos plate	24.00 to 24.50
No. 1 busheling	20.00 to 20.50
Hydraulic bundles	20.25 to 21.25
Machine shop turn.....	14.00 to 14.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$20.00 to $21.00
No. 2 hvy. mltng. steel.	19.00 to 20.00
Comp. sheet steel	$19.50 to $20.50
Light bund. stampings	15.00 to 15.50
Drop forge flashings...	18.00 to 18.50
Machine shop turn....	12.50 to 13.00
Short shov. turn.....	14.50 to 15.00
No. 1 busheling	19.25 to 19.75
Steel axle turnings...	19.50 to 20.00
Low phos. billet and bloom crops	24.50 to 25.00
Cast iron borings.....	16.00 to 16.50
Mixed bor. & turn.....	16.00 to 16.50
No. 2 busheling	16.00 to 16.50
No. 1 machinery cast.	24.00 to 24.50
Railroad cast	23.00 to 23.50
Railroad grate bars ...	15.00 to 15.50
Stove plate	15.00 to 15.50
Rails under 3 ft.....	26.00 to 27.00
Rails for rolling.....	26.00 to 26.50
Railroad malleable ...	24.50 to 25.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$20.50 to $21.00
No. 2 hvy. mltng. steel.	18.50 to 19.00
Scrap rails	22.00 to 22.50
New hvy. b'ndled sheets.	18.00 to 18.50
Old hydraul. bundles..	17.00 to 17.50
Drop forge flashings..	18.00 to 18.50
No. 1 busheling	18.00 to 18.50
Machine shop turn....	13.50 to 14.00
Shov. turnings	15.50 to 16.00
Mixed bor. & turn....	14.50 to 15.00
Cast iron borings.....	14.50 to 15.00
Knuckles & coupiers..	**25.00 to 25.50**
Coil & leaf springs....	**25.00 to 25.50**
Rolled steel wheels...	**25.00 to 25.50**
No. 1 machinery cast..	21.50 to 22.00
No. 1 cupola cast.....	20.00 to 20.50
Stove plate	17.50 to 18.00
Steel rails under 3 ft..	27.00 to 27.50
Cast iron carwheels...	20.50 to 21.50
Railroad malleable ...	24.00 to 24.50
Low phos. plate	26.50 to 27.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting.	$18.00 to $18.50
No. 1 hvy. melting....	**17.50 to 18.00**
No. 2 hvy. melting....	**16.50 to 17.00**
No. 1 locomotive tires	19.50 to 20.00
Misc. stand. sec. rails.	19.50 to 20.00
Railroad springs	21.50 to 22.00
Bundled sheets	12.50 to 13.00
Cast bor. & turn.....	**11.00 to 11.50**
Machine shop turn.....	10.75 to 11.25
Heavy turnings	**13.50 to 14.00**
Rails for rerolling	22.00 to 22.50
Steel car axles	**25.00 to 25.50**
No. 1 RR wrought....	14.00 to 14.50
No. 2 RR. wrought....	16.00 to 16.50
Steel rails under 3 ft..	23.50 to 24.00
Steel angle bars	21.25 to 21.75
Cast iron carwheels...	**21.00 to 21.50**
No. 1 machinery cast.	19.50 to 20.00
Railroad malleable	20.00 to 21.00
Breakable cast	**17.50 to 18.00**
Stove plate	**15.00 to 15.50**
Grate bars	14.00 to 14.50
Brake shoes	13.50 to 14.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel.	$18.25 to $18.75
No. 2 hvy. mltng. steel.	**16.25 to 16.75**
Scrap rails for mltng.	23.25 to 23.75
Loose sheet clippings.	12.75 to 13.25
Hyd'lic bundled sheets	**17.00 to 17.50**
Cast iron borings	9.25 to 9.75
Machine shop turn....	**10.00 to 10.50**
No. 1 busheling	14.25 to 14.75
No. 2 busheling	7.75 to 8.25
Rails for rolling	24.50 to 25.00
No. 1 locomotive tires.	20.25 to 20.75
Short rails	26.25 to 26.75
Cast iron carwheels..	18.75 to 19.25
No. 1 machinery cast..	22.25 to 22.75
No. 1 railroad cast...	**20.50 to 21.00**
Burnt cast	12.75 to 13.25
Stove plate	12.75 to 13.25
Agricul. malleable	18.00 to 18.50
Railroad malleable ...	21.00 to 21.50
Mixed hvy. cast.	19.25 to 19.75

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting steel	$18.00
No. 2 hvy. melting steel	17.00
No. 1 busheling	16.00
Scrap steel rails	18.00
Steel rails under 3 ft..	20.00
Rails for rolling.....	19.00
Long turnings	9.50
Cast iron borings	8.50
Stove plate	13.50
Steel axles	18.00
No. 1 RR. wrought....	16.00
No. 1 cast	18.50
No. 2 cast	13.50
Cast iron carwheels...	19.00
Steel carwheels	18.00

DETROIT

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 heavy melting..	$16.25 to $16.75
No. 2 heavy melting..	15.25 to 15.75
Borings and turnings.	11.25 to 11.75
Machine shop turnings.	10.75 to 11.25
Long turnings	9.75 to 10.25
Short shov. turnings.	11.75 to 12.25
No. 1 cast	19.50 to 20.00
Automotive cast	19.50 to 20.00
Hvy. breakable cast..	16.00 to 16.50
Stove plate	11.50 to 12.00
Hydraul. comp. sheets.	17.75 to 18.25
New busheling	16.25 to 16.75
Sheet clips	13.75 to 14.25
Flashings	16.25 to 16.75
Low phos plate	18.50 to 19.00

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	$16.00 to $16.50
No. 2 hvy. mltng. steel.	15.00 to 15.50
Hvy. breakable cast...	18.50 to 19.00
No. 1 machinery cast.	19.00 to 19.50
No. 2 cast	17.50 to 18.00
Stove plate	15.50 to 16.00
Steel car axles	23.50 to 24.00
Shafting	20.00 to 20.50
No. 1 RR wrought....	17.50 to 18.00
No. 1 wrought long....	**17.00 to 17.50**
Spec. iron & steel pipe	13.00 to 13.50
Rails for rolling.....	19.50 to 20.00
Clean steel turnings*.	10.00 to 10.50
Cast borings*	11.00 to 11.50
No. 1 blast furnace...	9.00 to 9.50
Cast borings (chem.)..	11.00 to 11.50
Unprepared yard scrap	9.50 to 10.00
Light iron	7.00 to 7.50

Per gross ton delivered local foundries:

No. 1 machin. cast....	$21.00 to $22.00
No. 2 cast	18.00 to 18.50

* $1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars:

Breakable cast	$17.00 to $17.25
Machine shop turn....	9.25 to 9.75
Mixed bor. & turn.....	9.25 to 9.75
Bun. skeleton long ...	13.25 to 13.50
Shafting	19.25 to 19.50
Stove plate	14.00 to 14.25
Cast bor. chemical....	11.00 to 11.25

Per gross ton delivered consumers' yards:

Textile cast	$22.00 to $24.50
No. 1 machine cast....	22.00 to 24.00

Per gross ton delivered dealers' yards:

Unprepared yard scrap.	$11.00 to $12.15

PACIFIC COAST

Per net ton delivered to consumer:

	San Fran.	Los Ang.	Seattle
No. 1 hvy. mltng. steel	Nominal		
No. 2 hvy. mltng. steel			
Bundles			

CANADA

Dealers' buying prices at these yards, per gross ton:

	Toronto	Montreal
Low phos. steel.....	$14.00	$13.50
Specialty steel	15.00	14.50
No. 1 heavy mltng. steel	12.50	12.00
No. 2 heavy mltng steel	10.50	10.00
Mixed dealers' steel....	9.50	9.00
Drop forge flashings....	10.50	10.00
New loose clippings....	8.75	8.25
Busheling	7.50	7.00
Scrap pipe	8.75	8.25
Steel turnings	9.00	8.50
Cast borings	9.00	8.50
Machinery cast	24.75	24.00
Dealers' cast	22.50	22.00
Stove plate	19.50	19.00

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered barges	
No. 1 hvy. mltng. steel	$16.50
No. 2 hvy. mltng. steel.	15.50
No. 2 cast	18.00
Stove plate	16.00
Boston on cars at Army Base or Mystic Wharf	
No. 1 hvy. mltng. steel.	$17.25
No. 2 hvy. mltng. steel	15.75
Rail (scrap)	$17.25 to 17.50

* In the Feb. 20 issue, railroad heavy melting steel at Pittsburgh was incorrectly quoted at $20. It should have been $21 to $21.50. No. 2 heavy melting steel was incorrectly quoted at $19.50 to $20. It should have been a flat $20.

Construction Steel

. . . STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Lettings advanced to 33,525 tons from 23,850 tons last week; new projects higher at 31,700 tons; plate awards call for 2900 tons.

AWARDS

NORTH ATLANTIC STATES

2240 Tons, Fort Edward, N. Y., bridges for Delaware & Hudson Railroad, to American Bridge Co., Pittsburgh.

2100 Tons, Philadelphia, Pa., addition and alterations to crane runway, Cramp Shipbuilding Co., to Bethlehem Steel Co., Bethlehem, Pa.

1800 Tons, Burlington, N. J., power house extension, Public Service Electric & Gas Co., to Lehigh Structural Steel Co., Allentown, Pa.

790 Tons, Brooklyn, subway ramp connection, routes 49 and 109, to Bethlehem Steel Co., Bethlehem, Pa.

585 Tons, Elizabeth, N. J., Singer manufacturing building, to American Bridge Co., Pittsburgh.

570 Tons, Birdsboro, Pa., building for Birdsboro Steel Foundry & Machine Co., to American Fabricated Steel Co., Philadelphia.

420 Tons, Erie, Pa., extension to open hearth furnace for Erie Forge & Steel Co., to Erie Steel Construction Co., Erie.

420 Tons, Titusville, Pa., forge shop, to Rogers Structural Steel Co., Corry, Pa.

375 Tons, Queens, N. Y., city poultry market, to B. Schacht Steel Construction Co., New York.

310 Tons, Ansonia, Conn., American Brass Co. copper mill, to American Bridge Co., Pittsburgh.

200 Tons, Leaverett, Mass., State bridge, to Phoenix Bridge Co., Boston, through Peter Salvucci, Waltham, Mass., contractor.

200 Tons, Wellsville, N. Y., storage building for Sinclair Refining Co., to American Bridge Co., Pittsburgh.

175 Tons, Brooklyn, bulb angle curbing, 3rd Avenue, for Triboro Bridge Authority, to American Bridge Co., Pittsburgh.

150 Tons, Ithaca, N. Y., transformer testing building for Cornell University, to American Bridge Co., Pittsburgh.

150 Tons, Boston, Northeastern University laboratory, to Lehigh Structural Steel Co., Allentown, Pa., through McCutcheon Co., Boston, contractor.

100 Tons, Buffalo, plant extension for Hewitt Rubber Co., to Ernst Iron Works, Buffalo.

THE SOUTH

3000 Tons, Childersburg, Ala., ordnance plant for E. I. du Pont de Nemours & Co., to Virginia Bridge Co., Roanoke, Va.

900 Tons, Baytown, Tex., cracking tower for Standard Oil Co. of New Jersey, to American Bridge Co., Pittsburgh.

350 Tons, Little Rock, Ark., municipal airport, to Arkansas Foundry Co., Little Rock.

285 Tons, Medford, Okla., State highway bridge, to Capitol Steel & Iron Co., Oklahoma City.

250 Tons, Falmouth, Ky., South Fork Licking River, State bridge, to American Bridge Co., Pittsburgh.

185 Tons, Atlanta, Ga., packing building for Swift & Co., to Ingalls Iron Works Co., Birmingham, through A. Farnell Blair.

160 Tons, Miami Beach, Fla., power house extension, to Lehigh Structural Steel Co., Allentown, Pa.

140 Tons, Louisville, Ky., Kresge store, to Snead Architectural Iron Works, Louisville.

CENTRAL STATES

3200 Tons, Cleveland, plant for Thompson Products, Inc., in Euclid, to Burger Iron Co., Akron.

2700 Tons, Burlington, Iowa, storage buildings, to Illinois Steel Bridge Co., Jacksonville, Ill.

1150 Tons, Lake City, Mo., Remington Arms ordnance plant, to Bethlehem Steel Co., Bethlehem, Pa.

375 Tons, Youngstown, main central office building for Ohio Bell Telephone Co., to American Bridge Co., Pittsburgh.

130 Tons, Cleveland, store building in Shaker Heights, to Builders Structural Steel Co., Cleveland.

WESTERN STATES

9000 Tons, Denver, ordnance plant, to Bethlehem Steel Co., Bethlehem, Pa.

800 Tons, Richmond, Cal., Todd-California Shipbuilding Corp. shipyard, to Isaacson Iron Works, Seattle.

160 Tons, Oakland, Cal., Gaylord Container Corp. factory, to Superior Structural Steel Co., St. Louis.

156 Tons, Bakersfield, Cal., two State bridges across Kern River, to Golden Gate Iron Works, San Francisco, through Fred Fredenburg, South San Francisco, Cal., contractor.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

4000 Tons, Quincy, Mass., extension to shipway structure for Fore River Shipbuilding Co.

2000 Tons, Chester, Pa., structural steel and H-piles for shipways, Sun Shipbuilding Corp.; bids March 30.

1100 Tons, New York, apartment house for L. Victor Weil.

900 Tons, Bath, Me., storage building and welding shop for Bath Iron Works.

800 Tons, Brooklyn, public school No. 25.

700 Tons, Milford, Conn., buildings for Maggi Co.

350 Tons, Buffalo, building No. 61 for National Aniline & Chemical Co.; bids March 1.

250 Tons, Southbridge, Mass., warehouse for Southbridge Finishing Co.

225 Tons, Washington, generator house for Washington Gas Light Co.

200 Tons, New York, addition, for Home for Aged and Infirm Hebrews.

190 Tons, Long Island City, N. Y., warehouse for Owens-Illinois distributers.

175 Tons, South Amboy, N. J., factory building for South Amboy Realty Co.

160 Tons, Geneva, N. Y., foundry building for Geneva Foundry Corp.

160 Tons, Schenectady, N. Y., extension to building No. 49, General Electric Co.

120 Tons, Bound Brook, N. Y., still house extension for Bakelite Corp.

THE SOUTH

4000 Tons, Narrows, Va., addition to building for Celanese Corp.; bids March 8.

3000 Tons, Norfork, Ark., Government dam; Utah Construction Co., San Francisco, and Morrison-Knudsen Co., Boise, Idaho, low bidders on general contract.

275 Tons, Pratt, W. Va., State beam spans.

270 Tons, Lexington, Ky., Nurses' Home for Sisters of Charity of Nazareth.

165 Tons, Watts Bar Dam, Tenn., power house intake trashracks for TVA.

CENTRAL STATES

5000 Tons, Indianapolis, precision instrument factory for Navy.

4500 Tons, Massillon, Ohio, flood protection project, U. S. Engineers Office.

1500 Tons, Marysville, Mich., boiler house and turbine room extension for Detroit Edison Co.

1200 Tons, Milwaukee, manufacturing buildings for Norberg Mfg. Co.

450 Tons, various locations, Illinois Central System, 1941 bridge requirements.

310 Tons, Wheatland, Ind., State bridge, contract No. 2126.

300 Tons, Rocheport, Mo., State highway bridge.

260 Tons, Hilliard and Arthur, Mo., bridges Nos. 180 and 80, for Missouri Pacific Railroad.

190 Tons, Dearborn, Mich., alterations to rotunda building, Ford Motor Co.

160 Tons, Galion, Ohio, buildings for Galion Metallic Vault Co.

150 Tons, Superior, Wis., shop building for Lake Superior Shipbuilding Co.

140 Tons, Rocky River, Ohio, Edison office building for Ohio Bell Telephone Co.

100 Tons, Bellevue, Ohio, building for General Electric Co.

100 Tons, Euclid, Ohio, extension for Euclid Road Machinery Co.

WESTERN STATES

1037 Tons, Los Angeles, Los Angeles River improvement, section VII; bids about April 2.

245 Tons, Long Beach, Cal., bulkhead at pier D, channels, angles, rods and turnbuckles (Specifications HD-108); bids March 4.

166 Tons, Clifton, Ariz., bridge on Duncan-Clifton highway; bids March 5.

FABRICATED PLATES

AWARDS

2900 Tons, Staten Island, N. Y., 10 tanks for Gulf Oil Corp., to Bethlehem Steel Co., Bethlehem, Pa.

SHEET PILING

AWARDS

850 Tons, Cleveland, Cuyahoga River turning basin, to Bethlehem Steel Co., Bethlehem, Pa., through Great Lakes Dredge & Dock Co., Cleveland.

Weekly Bookings of Construction Steel

Week Ended ——→	Feb. 25, 1941	Feb. 18, 1941	Jan. 28, 1941	Feb. 27, 1940	Year to Date 1941	Year to Date 1940
Fabricated structural steel awards	33,525	23,850	43,850	9,850	286,925	128,310
Fabricated plate awards	2,900	850	930	5,055	25,945	25,080
Steel sheet piling awards	1,200	0	655	1,790	4,450	6,275
Reinforcing bar awards	8,650	6,050	10,710	2,900	79,290	57,020
Total Letting of Construction Steel	46,275	30,750	56,145	19,595	396,610	216,685

350 Tons, Detroit, Coast Guard Station, to Carnegie-Illinois Steel Corp., Pittsburgh, through Great Lakes Dredge & Dock Co., Cleveland.

PENDING PROJECTS

6000 Tons, Boston, Navy Yard pier. J. F. Fitzgerald Construction Co., Boston, contractor.

2034 Tons, Long Beach, Cal., bulkhead at pier D (Specification HD-108); bids March 4.

775 Tons, Los Angeles, Los Angeles River improvement, section VII; bids about April 2.

Reinforcing Steel

Awards of 8,650 tons; 16,250 tons in new projects.

AWARDS

ATLANTIC STATES

1200 Tons, Washington, Capitol Street armory buliding, to Bethlehem Steel Co., Bethlehem, Pa., through Charles H. Tompkins, contractor.

1000 Tons, Baltimore, Gilmore housing, to Capitol Steel Corp., New York, through Woodcrest and Rosoff.

700 Tons, Brooklyn, Navy Yard receiving barracks, to Truscon Steel Co., Youngstown, through White Construction Co.

500 Tons, Washington, Scott Circle underpass, to Capitol Steel Corp., New York, throught Cayuga Construction Co.

200 Tons, Wilmington, Del., Hales & Hunter grain elevator, to Bethlehem Steel Co., Bethlehem, Pa., through McKenzie & Hague, Inc., contractor.

200 Tons, Boston, Gulf Oil Corp. station, to Northern Steel Co., Boston.

134 Tons, New Haven, Conn., St. Raphael Hospital, to Truscon Steel Co., Youngstown, through Fox Steel Co.

100 Tons, Boston, Northeastern University laboratory, to Joseph T. Ryerson & Son, Inc., Cambridge, Mass.

SOUTH AND CENTRAL

2000 Tons, Burns City, Ind., shell storage plant, to Inland Steel Co., Chicago, through Maxon Construction Co., contractor.

800 Tons, Wilmington, Ill., conveyor ramps, to Cecо Steel Products Corp., Cicero, Ill.

505 Tons, Chicago, Studebaker Corp. aircraft plant, to Bethlehem Steel Co., Bethlehem, Pa., through S. N. Nielsen Co., contractor.

300 Tons, Ogallala, Neb., Kingsley Dam, U. S. Engineer, to Sheffield Steel Corp., Kansas City.

250 Tons, Fort Wayne, Ind., Studebaker Corp., aircraft engine plant, to Cecо Steel Products Corp., Cicero, Ill., through Charles R. Wermuth, contractor.

125 Tons, Fort Sam Houston, Tex., requirements of Quartermaster Corps, to Truscon Steel Co., Youngstown.

100 Tons, Green Cove Springs, Fla., mesh for Naval air station, to Truscon Steel Co., Youngstown.

WESTERN STATES

255 Tons, Keyport, Wash., four buildings for Naval torpedo station, to Truscon Steel Co., Youngstown, through J. W. Bailey Construction Co.

177 Tons, Coram, Cal., Shasta power plant (Invitation A-33,109-A-2), to Columbia Steel Co., San Francisco.

105 Tons, Ampere, Wash., Bonneville Administration substation (Invitation 1674), to Bethlehem Steel Co., Portland, Ore.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

1600 Tons, Brooklyn, Triborough Bridge Authority contract B-19.

400 Tons, New Haven, Conn., hospital, Dwight Building Co., New Haven, contractor.

SOUTH AND CENTRAL

4000 Tons, Denver, Remington Arms Co. ammunition plant.

1800 Tons, Norfork, Ark., dam for Government, Utah Construction Co., San Francisco, and Morrison-Knudsen Co., Boise, Idaho, low bidders on general contract.

1500 Tons, Clark County, Ind., Goodyear Engineering Corp. powder bagging plant, Winston Bros., contractor.

1200 Tons, Portsmouth-New Boston, Ohio, flood wall, unit No. 2.

475 Tons, Louisville, Ky., Louisville Gas & Electric Co. plant.

450 Tons, Louisville, DuPont-National Carbon Co. plant.

300 Tons, Milwaukee, Plankington Packing Co. plant.

300 Tons, Milwaukee, Cudahy Packing Co. plant.

260 Tons, Fort Wayne, Ind., U. S. Engineer, concrete runways.

200 Tons, Fort Benjamin Harrison, Ind., sewage disposal plant.

WESTERN STATES

2250 Tons, Los Angeles, Los Angeles River improvement, section V; bids about March 28.

730 Tons, Los Angeles, Los Angeles River improvement, section VII; bids about April 2.

390 Tons, Paso Robles, Cal., San Juan Creek highway bridge; bids March 12.

217 Tons, Davis, Cal., four State highway bridges; bids March 12.

178 Tons, Kremmling, Colo., Colorado-Big Thompson project (Invitation B-46,491-A); bids Feb. 27.

Pipe Lines

Burt C. Blanton, 3708 Harvard Street, Dallas, Tex., representing a company which plans to furnish natural gas to several municipalities in Kerr County, Tex., will make surveys soon for main welded steel pipe line from point near Refugio, Tex., to Kerrville, Tex. Also will make surveys for pressure pipe line distribution system at latter place, including control station, meter house and other operating facilities, and similarly, construction of branch pipe line to Legion, Tex., about 10 miles, and distribution system and operating facilities in that municipality. Entire project will cost over $350,000. Kelly Construction Co., Builders' Exchange Building, San Antonio, Tex., is engineer, in charge of survey and installation.

Los Angeles Bureau of Water Works and Supply, Los Angeles, has arranged fund of about $3,500,000 for extensions and replacements in steel and cast iron pipe lines, and other waterworks equipment and facilities. Of amount noted, about $1,000,000 will be used for replacements. H. A. Van Norman is general manager and chief engineer.

Moss Point, Miss., closes bids Feb. 28 for pressure pipe line system for municipal natural gas distribution, including main line and local operating facilities. F. P. Joseph, Glenmora, La., is consulting engineer.

Palacios, Tex., has authorized surveys and plans for pressure pipe line system for municipal natural gas distribution, including main welded steel pipe line from source of supply, control station and other operating facilities. Cost about $100,000. Garrett Engineering Co., 918 Richmond Street, Houston, Tex., is consulting engineer.

Kane Gas Co., Inc., Kane, Pa., plans pipe lines in connection with development of natural gas properties near Mount Jewett, Pa., including gathering lines and main line for connection with gas transmission system.

Alexander, La., closes bids March 3 for 1100 ft. of 12-in. standard black steel pipe, threaded and coupled with line pipe couplings, for main water line from new source now being developed.

Union Oil & Gas Co., Inc., Winfield, W. Va., plans 3-in. steel pipe line across Kanawha River, starting at Winfield to point at distance from opposite shore, for natural gas transmission. Line will be from 3 to 5 ft. underground for a distance of 75 ft. from each bank, and will be installed on river bottom for remainder of distance.

Commanding Officer, Ordnance Department, Rock Island Arsenal, Rock Island, Ill., asks bids until March 3 for 8300 feet of welded wrought iron pipe, black and galvanized (Circular 1160).

Oklahoma Natural Gas Co., Oklahoma City, Okla., plans new 6-in. welded steel pipe line from connection with main pipe line at city limits to municipal airport, for natural gas supply to new bomber squadron station at that point. Work will be carried out by company forces. Cost close to $50,000.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 4 for steel pipe for naval stations at Key West and Florida City, Fla.; also for cast iron and wrought iron pipe, same locations (Schedule 5441).

Cast Iron Pipe

Pepperell, Mass., contemplates purchase of 1363 ft. of 8-in. pipe for extension of water main on Tucker Street to Chase Avenue.

Windsor Locks, Conn., Government airport, will have a water supply, sewerage and drainage system. Considerable pipe will be required.

Fremont, Neb., will begin work soon on pipe lines for water system and other waterworks installation, including pumping station; also pipe lines for sewer system. Cost about $148,300. Financing has been arranged through Federal aid.

Waynesville, Mo., plans pipe lines for water system and other waterworks installation. Cost about $46,400. Financing is being arranged through Federal aid. Russell & Axon, 4903 Delmar Boulevard, St. Louis, are consulting engineers.

Water Commission, Appleton, Wis., asks bids until March 5 for 6000 ft. of 6-in. pipe, 1500 ft. of 8-in., and 1000 ft. of 4-in. for water system; also for fittings. At same time, under separate contract, for 20 6-in. and four 4-in. hub end cast iron gate valves.

Water Department, Houston, Tex., E. L. Fugate, chief engineer, plans pipe line extensions and replacements in water system in different parts of city. Cost about $150,000.

Bowling Green, Ohio, plans extensions in water pipe line in Haskins Street, requiring about 800 ft. of 8-in., and 1600 ft. of 6-in., with fittings, hydrants, etc.

Water Department, San Antonio, Tex., plans about two miles of 12-in. pipe for main water line; also new 250,000-gal. elevated steel tank on 100-ft. tower near Austin Road. W. D. Masterson is manager.

Whitewater, Kan., plans pipe lines for water system and other waterworks installation. Cost about $140,000. Financing is being arranged through Federal aid. Paulette & Wilson, Public Utilities Building, Salina, Kan., are consulting engineers.

Reynolds Metal Signs Bonneville Power Contract

Washington

• • • **Announcement was** made on Tuesday that, in order to increase output of aluminum for defense needs, a 20-year contract has been signed by R. S. Reynolds, president, Reynolds Metals Co., and the Bonneville Power Administrator for delivery of Columbia River power to a plant to be built by the company in the Pacific Northwest, the exact site not yet determined. The contract calls for 40,000 kilowatts of hydroelectric power.

Construction of the plant will be started immediately, it was stated, and it will have an initial capacity of 40,000,000 lb. of aluminum annually. Production of pig aluminum in the new plant is scheduled to begin June 15.

The announcement said that the company contemplates expanding its operations to include not only the production of virgin aluminum but also the manufacture of finished products in that field.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes[2]	3.80¢		3.80¢									4.55¢			
Wrought iron	4.75¢														
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢		
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢		
TIN PLATE Standard cokes (Per 100-lb. base box)	$5.00	$5.00	$5.00						$5.10						
BLACK PLATE 29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (10)			
TERNES, M'FG. Special coated (Per base box)	$4.30		$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel[6]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.56¢	2.25¢		
Reinforcing (rail)[7]	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢				2.40¢	2.46¢	2.15¢		
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)						
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Coatesville and Claymont = 2.10¢)		2.45¢	2.65¢		2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
Alloy	3.50¢	3.50¢			(Coatesville = 3.50¢)										
SHAPES Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
WIRE[9]															
Bright	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)								
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)								
Spring	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)								
PILING Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			
IRON BARS Common		2.25¢			(Terre Haute, Ind. = 2.15¢)										
Refined	3.75¢														
Wrought	4.40¢														

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to 29 gage within certain width and length limitations. [6] For merchant trade. [7] Straight lengths as quoted by distributers. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lots to manufacturing trade. [10] Boxed.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher f.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the forging of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)	*Per Lb.*
Pittsburgh, Chicago, Cleveland.	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 4/64 in., $3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cut nails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	$3.05
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	56
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. and smaller by 6 in. and shorter	68
9/16 and ⅝ in. by 6 in. and shorter	66
¾ to 1 in. by 6 in. and shorter	64
1⅛ in. and larger, all lengths	62
All diameters over 6 in. long	62
Lag, all sizes	65
Plow bolts	68½
Hot pressed nuts; c.p.c., t-nuts; square, hex., blank or tapped:	
½ in. and smaller	66
9/16 to 1 in. inclusive	63
1⅛ to 1½ in. inclusive	61
1⅝ in. and larger	60

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

Semi-fin. hexagon nuts	U.S.S.	S.A.E.
½ in. and smaller	66	70
9/16 to 1 in.	63	65
1⅛ in. through 1½ in.	61	62
1⅝ in. and larger	60	

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	73 and 100
Stove bolts in packages, with nuts attached	73
Stove bolts in bulk	81

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York, lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.40

Small Rivets

(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 10

Cap and Set Screws

	Per Cent Off List
Milled hexagon head, cap screws, 1 in. dia. and smaller	50
Milled headless set screws, cut thread ¼ in. and larger	64
3/16 in. and smaller	73
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	68
Upset set screws, cup and oval points	74
Milled studs	52

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Feb. 19	Feb. 20	Feb. 21	Feb. 24	Feb. 25
Copper, Electrolytic[1]	12.00	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00	12.00
Tin, Straits, New York	52.875	54.25	53.75	53.00	53.00
Zinc, East St. Louis	7.25	7.25	7.25	7.25	7.25
Lead, St. Louis[3]	5.50	5.50	5.50	5.50	5.50

[1] Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

	New York	Cleveland
Tin		
Straits pig	53.75	56.00
Copper		
Electro	12.75	14.00
Castings	12.50	13.50
H. R. Sheets*	20.12	20.12
Seamless tubes*	20.62	20.62
Brass		
Yellow sheets*	18.65	18.65
Yellow, rods*	13.67	13.67
Seamless tubes*	21.40	21.40
Zinc		
Slabs	Nom'al	Nom'al
Sheet, No. 9 casks	13.50	Nom'al
Lead		
American pig	6.65	6.15
Bar	8.60	8.65
Cut sheets	8.90	8.90
Antimony		
Asiatic	16.00	17.00
Aluminum		
Virgin, 99%	20.00	21.00
No. 1 remelt., 98-99%	18.00	18.50
Solder		
½ and ½	32.075	33.25
Babbitt		
Anti-friction grade	23.50	22.25

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their use.

	Dealers' Buying Prices	Dealers Selling Prices
Copper		
Hvy. crucible	10.50	11.125
Hvy. and wire	9.50	9.90
Light and bottoms	8.50	9.00
Brass		
Heavy	6.50	7.00
Light	5.50	6.25
No. 1 yel. turn	6.00	6.50
No. 1 red or compo. turnings	9.25	10.25
Hvy. Mach. compo.	9.50	9.875
Lead		
Heavy	4.75	5.25
Aluminum		
Cast	Nom'l	Nom'l
Sheet	Nom'l	Nom'l
Zinc	Nom'l	Nom'l

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 17c.-18c. a lb.; No. 12 remelt No. 2, standard, 17-17.50c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICKSILVER, $172, per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33⅓; on brass sheets and rods, 40; on brass tubes, 33⅓, and copper tubes, 40.

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem . . . $54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade	2.70c.
Delivered, Detroit	2.80c.

S.A.E. Series Numbers	Alloy Differential, per 100 Lb.
2000 (1.5 Ni)	$0.35
2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.70
2500 (5 Ni)	2.55
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)	0.75
x4340 Cr-Ni-Mo	1.70
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.20
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)	2.60
6100 Cr-V bar	1.20
6100 Cr-V spring steel	0.85
C-V	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c. carlots.

Alloy Steel Plates

Base per lb., f.o.b. Pittsburgh, Chicago and Coatesville.

Open hearth grade . . . . . 3.50c.

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
H'tstrip	17.00c.	17.50c.	24.00c.	35.00c.
C'ld st.	22.00c.	22.50c.	32.00c.	52.00c.

20% Chromium-Nickel Clad Steel

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

TOOL STEEL

(F.o.b. Pittsburgh)

	Base per Lb
High speed	67c.
High-carbon-chromium	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld, Hot Rolled
1 in. o.d.	13 B.W.G.	$9.01	$7.82	....
1¼ in. o.d.	13 B.W.G.	10.67	9.26	....
1½ in. o.d.	13 B.W.G.	11.70	10.23	$9.72
1¾ in. o.d.	13 B.W.G.	13.42	11.64	11.06
2 in. o.d.	13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d.	13 B.W.G.	16.76	14.54	13.79
2¼ in. o.d.	12 B.W.G.	18.45	16.01	15.16
2½ in. o.d.	12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d.	12 B.W.G.	21.42	18.59	17.54
3 in. o.d.	12 B.W.G.	22.48	19.50	18.35
3½ in. o.d.	11 B.W.G.	28.37	24.62	23.15
4 in. o.d.	10 B.W.G.	35.20	30.54	28.66
4½ in. o.d.	10 B.W.G.	43.04	37.35	35.22
5 in. o.d.	9 B.W.G.	54.01	46.87	44.25
6 in. o.d.	7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb .or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought iron pipe)

Base Price = $200 Per Net Ton

Butt Weld

Steel	Black	Galv.
⅛ in.	56	36
¼ to ⅜ in.	59	43½
½ in.	63½	54
¾ in.	66½	58
1 to 3 in.	68½	60½
Wrought Iron	Black	Galv.
¼ and ⅜ in.	+9	+10
½ in.	24	6½
¾ in.	30	13
1 and 1¼ in.	34	19
1½ in.	38	21½
2 in.	37½	21

Lap Weld

Steel		
2 in.	61	52½
2½ and 3 in.	64	55½
3½ to 6 in.	66	57¼
7 and 8 in.	65	55½
9 and 10 in.	64½	55
11 and 12 in.	63½	54
Wrought Iron		
2 in.	30½	15
2½ to 3½ in.	31½	17½
4 in.	33½	21
4½ to 8 in.	32½	20
9 to 12 in.	28½	15

Butt weld, extra strong, plain ends

Steel	Black	Galv.
⅛ in.	54½	41½
¼ to ⅜ in.	56½	45½
½ in.	61½	53½
¾ in.	65½	57½
1 to 3 in.	67	60
Wrought Iron		
¼ and ⅜ in.	+10	+43
½ in.	25	9
¾ in.	31	15
1 to 2 in.	38	22½

Lap weld, extra strong, plain ends

Steel		
2 in.	59	51½
2½ and 3 in.	63	55½
3½ to 6 in.	66½	59
7 and 8 in.	65½	56
9 and 10 in.	64½	55
11 and 12 in.	63½	54
Wrought Iron		
2 in.	33½	18½
2½ to 4 in.	39	25½
4½ to 6 in.	37½	24
7 and 8 in.	38½	24½
9 to 12 in.	32	20½

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

	Per Gross Ton
Old range, bessemer, 51.50%...	$4.75
Old range, non-bessemer, 51.50%	4.60
Mesaba, bessemer, 51.50%	4.60
Mesaba, non-bessemer, 51.50%	4.45
High phosphorus, 51.50%	4.35

Foreign Ores*

C.i.f. Philadelphia or Baltimore, Exclusive of Duty

	Per Unit
African, Indian, 44 to 48% Mn...	57c.
African, Indian, 49 to 51% Mn...	60c.
Brazilian, 46 to 48% Mn.	54c.
Cuban, del'd, duty free, 51% Mn.	67½c.

	Per Short Ton Unit
Tungsten, Chinese, Wolframite, duty paid, delivered	$23 to $24
Tungsten, domestic, scheelite, delivered	$23.00
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	Nom.
Rhodesian, 45%	$25.00
Rhodesian, 48%	$28.00 to $30.00

RAILS, TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., gross ton	$40.00
Angle bars, 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets), gross ton	$40.00
Light rails (from rail steel), gross ton	39.00

	Base per Lb.
Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts, steam railroads	4.15c.
Track bolts, discount to jobbers all sizes (per 100 counts)	65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR *Per Net Ton*

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail	$20.00 to $21.00
Domestic, f.o.b. Ohio River landing barges	20.00 to 21.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	20.00 to 21.00
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid	Nominal
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	31.00
As above, in bags, f.o.b. same mines	32.60

REFRACTORIES

Fire Clay Brick *Per 1000 f.o.b. Works*	
Super-duty brick at St. Louis	$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1 Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick	
Pennsylvania	$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement, net ton (Eastern)	8.55

Chrome Brick *Net per Ton*	
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$50.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	

Magnesite Brick	
Standard f.o.b. Baltimore and Chester	$72.00
Chemically bonded, f.o.b. Baltimore	61.00

Grain Magnesite	
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	(—)*
Domestic, f.o.b. Baltimore and Chester in sacks	$40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

*None available.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....$36.00
Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

Per Gross Ton, Delivered, Lump Size

50% (carload lots, bulk).....$74.50*
50% (ton lots, packed..... 87.00*
75% (carload lots, bulk).....135.00*
75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio

10.00 to 10.50%.....$34.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2% $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, F.o.b. Jackson, Ohio

5.00 to 5.50%.....$28.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots Lump Size, on Contract

4 to 6% carbon.....11.00c.
2% carbon .....17.50c.
1% carbon .....18.50c.
0.10% carbon .....20.50c.
0.06% carbon .....21.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon $113.00*
2.50% carbon 118.00*
2% carbon 123.00*
1% carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload..... $2.00
Ferrotungsten, 100 lb. and less 2.25
Ferrovanadium, contract, per lb. contained V, del'd $2.70 to $2.90†
Ferrocolumbium, per lb. contained columbium f.o.b. Niagara Falls, N. Y., ton lots ..... $2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace, carload and contract, per net ton.....$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract per net ton.....$157.50

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton 58.50

Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsato (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville 75.00

Ferromolybdenum, per lb. Mo, f.o.b. furnace ..... 95c.

Calcium molybdate, per lb. Mo, f.o.b. furnace ..... 80c.
Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

FUEL OIL

No. 3, f.o.b. Bayonne, N. J.....4.30c.
No. 6, f.o.b. Bayonne, N. J.....2.98c.
No. 5 Bur. Stds., del'd Chicago..3.25c.
No. 6 Bur. Stds., del'd Chicago..2.75c.
No. 3 distillate, del'd Cleveland..5.50c.
No. 4 industrial, del'd Cleveland.5.25c.
No. 5 industrial, del'd Cleveland.5.00c.
No. 6 industrial, del'd Cleveland.4.75c.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt ..... $5.25 to $5.75

Foundry, f.o.b. Connellsville, prompt ..... $5.50 to $6.00

F'dry, by-product, Chicago 10.50

F'dry, by-product, New England 13.00

Foundry, by-product, Newark or Jersey City ..... $11.30 to $11.90

F'dry, by-product, Philadelphia. 11.13

F'dry, by-product, Cleveland.. 11.55

F'dry, by-product, Cincinnati 11.00

Foundry, Birmingham 7.50

F'dry, by-product, St. Louis $10.75 to $11.00

Foundry, from Birmingham, f.o.b. cars dock Pacific ports.. .. $14.75

BRITISH

British

Per Gross Ton, f.o.b. United Kingdom Ports

Ferromanganese, export £29 16s. 3d.

Tin plate, per base box. 32s. to 33s.

Steel bars, open hearth £16 10s.

Beams, open hearth....£15 8s.

Channels, open hearth £15 8s.

Angles, open hearth £15 8s.

Black sheets, No. 24, gage £22 5s. max.* £22 5s. min.**

Galvanized sheets, No. 24 gage £25 12s. 6d. max.*; £25 12s. 6d. min.**

*Empire markets only.
**Other than Empire markets.

PIG IRON (Per Gross Ton)

Prices delivered various consuming points indicated by bold italics

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston	***$25.50***	***$25.00***	***$26.50***	***$26.00***	.....
Brooklyn	***27.50***	.....	.....	***28.00***	.....
Jersey City	***26.53***	***26.03***	***27.53***	***27.03***	.....
Philadelphia	***25.84***	***25.34***	***26.84***	***26.34***	.....
Bethlehem, Pa.	$25.00	$24.50	$26.00	$25.50	.....
Everett, Mass.	25.00	24.50	26.00	25.50	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....
Steelton, Pa.	.....	24.50	.....	.....	28.50
Birdsboro, Pa.	25.00	24.50	26.00	25.50	28.50
Sparrows Point, Md.	25.00	24.50	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....
Sharpsville, Pa.††	24.00	23.50	24.50	24.00	.....
Buffalo	24.00	23.00	25.00	24.50	28.50
Cincinnati	***24.44***	***24.61***	.....	***25.11***	.....
Canton, Ohio	***25.39***	***24.89***	***25.89***	***25.39***	.....
Mansfield, Ohio	***25.94***	***25.44***	***26.44***	***25.94***	.....
St. Louis	***24.50***	***24.02***	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	.....
Granite City, Ill.	24.00	23.50	24.50	24.00	.....
Cleveland	24.00	23.50	24.50	24.00	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....
Toledo	24.00	23.50	24.50	24.00	.....
Youngstown††	24.00	23.50	24.50	24.00	.....
Detroit	24.00	23.50	24.50	24.00	.....
St. Paul	***26.63***	.....	***27.13***	***26.63***	.....
Duluth	24.50	.....	25.00	24.50	.....
Birmingham	19.38	18.00	24.00	.....	.....
Los Angeles, San Francisco and Seattle	***27.50***	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....
Montreal†	27.50	27.50	.....	28.00	.....
Toronto†	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fce.....$23.50

CHARCOAL

Lake Superior fce.....$27.00
Delivered Chicago 30.34

Base prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Delivered prices on Southern iron for shipment to Northern points are 38c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over. †On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

††Pittsburgh Coke & Iron and Struthers furnaces are quoting $24.50 a ton for No. 2 foundry, basic and malleable, and $25.00 a ton for bessemer iron at Sharpsville and Youngstown.

WAREHOUSE PRICES

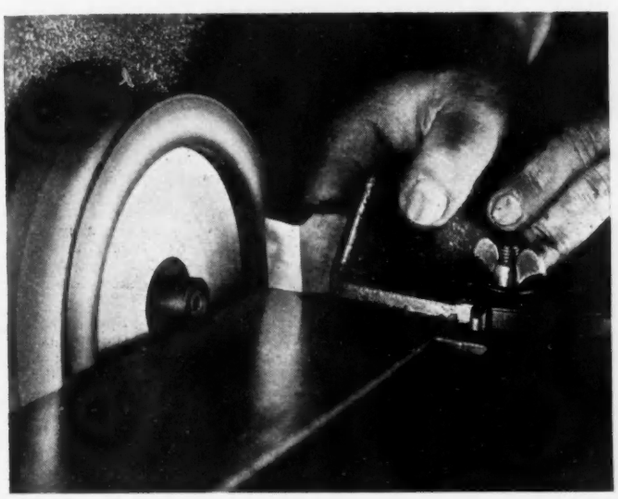
(Base Prices, Dollars per 100 lb., Delivered Metropolitan Areas)

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St Louis	St Paul	Milwaukee	Los Angeles
Sheets, hot rolled	$3.35	$3.05	$3.35	$3.55	$3.58	$3.23	$3.25	$3.71	$3.45	$3 39	$3.30	$3.38	$4.30
Sheets, cold rolled	....	4.10	4.05	4.05	4.40	4.30	4.30	3.68		4.12	4.35	4.23	6.50
Sheets, galvanized	4.75	4.60	4.62	4.90	5.00	4.64	4.75	5.11	4.75	4.87	4.75	4.98	5.25
Strip, hot rolled	3.60	3.40	3.50	3.95	3.96	3.48*	3.82	4.06	3.70	3.74	3.65	3.73	...
Strip, cold rolled	3.20	3.30	3.20	3.31	3.51	3.20	3.22	3.46	....	3.61	3.83	3.54	....
Plates	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.35	3.69	3.80	3.68	4.00
Structural shapes	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3 85	3.55	3.69	3.80	3.68	4.15
Bars, hot rolled	3.35	3 50	3.25	3.85	3.84	3.43	3 35	3.98	3.50	3.64	3.75	3 63	4 15
Bars, cold finished	3.65	3.75	3.75	4.06	4 09	3.80	3 75	4.13	4.43	4 02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7 20	7.10	7.55	7.31	7.60	7.42	7 35	7.50	....	7.72	7.45	7.58	9.40
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300	8.15	8.15	8 40	8.56	8.84	8.45	8.40	8.63	....	8.77	8.84	8.63	10.65
Bars, cd. drn. SAE 3100	6.75	6.75	7 75	7.16	7.19	7 05	6.75	7.23	....	7.12	7.44	6 98	9.80

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb.; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, shapes, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 150 to 1049 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, $3.23.

HELP FOR NEW USERS OF CARBIDE TOOLS

Diamond wheels by Carborundum can do a better job of sharpening and reconditioning at less cost...



● A recently announced substantial reduction in the price of cemented carbides means that more manufacturers than ever are using cutting tools of this remarkable material. It means too, that many manufacturers for the first time will be confronted with the problem of how best to sharpen cemented carbide tools and keep them in condition.

The problem has already been solved by the development of the Carborundum Brand Diamond Wheel. This wheel, made of crushed diamond bort, has been sensationally successful in reconditioning cemented carbide tipped tools. The Carborundum Brand Diamond Wheel gives cleaner, sharper cutting edges, with less danger of cracking or checking the tip, than was ever before thought possible. And it gives these results at greatly reduced cost!

The advantages of the Carborundum Brand Diamond Wheel are fourfold: (1) It gives a sharp, clean, cutting edge without the added expense of lapping. (2) Tools last longer because the wheel is cool- and free-cutting; less stock is removed per grind to obtain a satisfactory cutting edge and tools need conditioning less often. (3) Saves time in grinding because a sharp, smooth edge is obtained directly from the wheel and rate of stock removal is amazingly high. (4) Reduces maintenance cost of grinding machines because the wheel cuts so easily with light grinding pressure.

Whether you are a new or old user of cemented carbide tools, why not enjoy all these benefits of the Carborundum Brand Diamond Wheel? Ask our representative for complete details.

CARBORUNDUM
ABRASIVE PRODUCTS

THE CARBORUNDUM COMPANY

REG. U. S. PAT. OFF.

Niagara Falls, N. Y.

Sales Offices and Warehouses in New York, Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh, Cincinnati, Grand Rapids

(Carborundum is a registered trade-mark of and indicates manufacture by The Carborundum Company)

Sales Possibilities

. . . CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic States

● **Reed-Prentice Corp.,** Cambridge Street, Worcester, Mass., metal-working machinery and parts, has let general contract to E. J. Cross Co., 150 Prescott Street, for one-story addition, 80 x 130 ft. Cost about $85,000 with equipment.

Fellows Gear Shaper Co., 78 River Street, Springfield, Vt., gear-cutting machinery and parts, has let general contract to Harty-Blaney Construction Co., 25 Huntington Avenue, Boston, for three-story addition, 40 x 78 ft., for storage and distribution Cost over $50,000 with equipment.

Atlantic Wire Co., Branford, Conn., steel wire products, has let general contract to Frank P. Sullivan, Inc., 110 Tyler Street, East Haven, Conn., for one-story addition, 40 x 112 ft., for expansion in annealing department. Cost over $65,000 with equipment. Leo F. Caproni, 122] Chapel Street, New Haven, Conn., is architect and engineer.

Construction Quartermaster, Ordnance Department, Springfield Armory, Springfield, Mass., plans one-story plant for arms manufacture in Hill Reservation. Cost about $850,000 with equipment, in which amount appropriation will be arranged.

Stanley Chemical Co., East Berlin, Conn., metallic paints, lacquers, etc., subsidiary of Stanley Works, Inc., New Britain, has let general contract to Hasson & Downes, 55 West Main Street, New Britain, for one-story addition, about 35 x 104 ft. Cost over $50,000 with equipment.

Todd-Bath Iron Shipbuilding Corp., South Portland, Me., recently organized interest of Todd Shipyards Corp., New York, and Bath Iron Works Corp., Bath, Me., will build nine shipways at new local plant, instead of five, as previously announced. Other units will include plate shop, 100 x 300 ft.; machine shop, 100 x 225 ft.; pipe shop, 50 x 200 ft.; general equipment and warehouse building, 75 x 300 ft.; office, garage and other structures, all one-story; also power plant, 75 x 100 ft. Cost about $5,000,000 with equipment. Sanders Engineering Co., 415 Congress Street, Portland, is general contractor. Charles T. Main, Inc., 201 Devonshire Street, Boston, is consulting engineer.

West Virginia Pulp & Paper Co., 230 Park Avenue, New York, has approved plans for expansion and improvements in branch paper mill at Charleston, S. C., including machinery for chemical recovery unit. Work will be carried out by company forces. Cost over $300,000 with equipment.

Habirshaw Cable & Wire Corp., Yonkers, N. Y., subsidiary of Phelps-Dodge Corp., has let general contract to Brown & Matthews, Inc., 122 East Forty-second Street, New York, for one-story warehouse, 140 x 240 ft., on Saw Mill River Road, Yonkers. Cost close to $90,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 5 for spiral-wound, metallic asbestos pipe flange gaskets for Brooklyn and Mare Island Navy yards (Schedule 5369); until March 4, ammeters and voltmeters for same yards (Schedule 5360).

Crucible Steel Co. of America, Inc., 405 Lexington Avenue, New York, has let general contract to Harry E. Nonemaker, 12 Oakland Road, Maplewood, N. J., for one and one-half story addition, 100 x 105 ft., to plant at Harrison, N. J., for expansion in machine shop and other departments. Cost close to $100,000 with equipment.

Bureau of Yards and Docks, Navy Department, Washington, will have plans drawn at once for two one and multi-story additions at Brooklyn Navy Yard, including new foundry and extension in present building No. 4. Cost about $1,500,000 with equipment. Lockwood Greene Engineers, Inc., 10 Rockefeller Plaza, New York, is architect and engineer.

Segal Lock & Hardware Co., 395 Broadway, New York, has let general contract to Cauway, Inc., 1841 Broadway, for one-story addition, about 10,000 sq. ft. of floor space, to plant at Norwalk, Conn. Cost close to $50,000 with equipment.

Carborundum Co., Niagara Falls, N. Y., grinding wheels and abrasive products, etc., has let general contract to Wright & Kremers, Inc., Main Street and Pine Avenue, for one-story addition to building No. 4, and improvements in present structure. Cost about $50,000 with equipment.

Geneva Foundry Corp., Geneva, N. Y., cast iron boilers, etc., plans rebuilding plant destroyed by fire recently. Loss about $300,000 with equipment.

Garlock Packing Co., Palmyra, N. Y., mechanical packing, has let general contract to John B. Pike & Son, Inc., 1 Circle Street, Rochester, N. Y., for two-story addition, 100 x 122 ft. Cost close to $80,000 with equipment. Carl C. Ade, 52 James Street, Rochester, is architect.

New Brunswick Nickel Plating Works, 128 Church Street, New Brunswick, N. J., plans one-story addition, 40 x 150 ft. Cost over $65,000 with equipment. Ernest Levine, 77 Paterson Street, is architect.

Mapes & Sprowl Steel Co., 63 Empire Street, Newark, N. J., steel products, has leased one-story building, 168 x 196 ft., with two-story extension, 48 x 50 ft., to be erected on Burnett Avenue, Union, N. J., by Geiger Engineering & Mfg. Co., 300 Burnett Avenue, Union, for new storage and distributing plant. Cost over $70,000 with equipment.

Hyatt Bearings Division, General Motors Corp., Harrison, N. J., has let general contract to F. J. Brotherton, Inc., 200 Main Street, Hackensack, N. J., for one-story addition, 80 x 240 ft. Cost over $100,000 with equipment.

Philco Radio & Television Corp., Tioga and C Streets, Philadelphia, has acquired former plant of FitzGibbons & Crisp Co., Calhoun Street, Trenton, N. J., automobile bodies, and will improve for new branch plant for production of electric storage batteries. Facilities will be provided for more than 300 employees.

Campbell Soup Co., Camden, N. J., has let general contract to Thomas F. Gibson Co., Commercial Trust Building, Philadelphia, for two-story addition, 85 x 120 ft. Cost over $100,000 with equipment. Lockwood Greene Engineers, Inc., 10 Rockefeller Plaza, New York, is architect and engineer.

Supply Officer, Naval Air Station, Lakehurst, N. J., asks bids until March 4 for one four-speed, heavy-duty, gasoline engine tractor, with electric self-starter and auxiliaries (Aero Req. 159).

Bureau of Yards and Docks, Navy Department, Washington, asks bids (no closing date stated) for three steel radio towers, each 160 ft. high, for Naval Air Station, Lakehurst, N. J. (Specifications 10264).

Erie Railroad Co., Midland Building, Cleveland, has authorized immediate rebuilding of one-story repair shop, 60 x 200 ft., at locomotive works, Susquehanna, Pa., recently destroyed by fire. Cost over $60,000 with equipment.

C. K. Williams & Co., Inc., North Thirteenth Street, Easton, Pa., mineral colors, chemicals, etc., plans new steam power house. Cost over $150,000 with equipment. Lockwood Greene Engineers, Inc., 10 Rockefeller Plaza, New York, is consulting engineer.

Reading Steel Casting Co., Tulpehocken Street, Reading, Pa., has let general contract to Potteiger Co., West Reading, for one-story addition, 60 x 140 ft., for expansion. Cost over $60,000 with equipment. Muhlenberg, Yerkes & Muhlenberg, Ganster Building, are architects.

General Electric Co., East Lake Road, Erie, Pa., has asked bids on general contract for one-story addition, 150 x 200 ft., for production of electric refrigerator cabinets and allied products. Cost over $100,000 with equipment.

Board of Public Education, Administration Building, Bellefield Avenue and Forbes Street, Pittsburgh, asks bids until March 4 for electric drills and sanding machines. H. W. Cramblet is secretary.

General Purchasing Officer, Panama Canal, Washington, asks bids until March 4 for two platform-type steel trucks, with platforms 24 x 48 in.; 30,000 ft. of bare copper antenna wire (Schedule 4840).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until March 4 for motor-driven sensitive drilling machines (Schedule 5471), tools and wrenches (Schedule 5389), hand-operated bilge pumps (Schedule 5416), anchor chain, links, shots and tool sets (Schedule 5368), gasoline engine portable pumps and spare parts (Schedule 5399), motor-driven tool and cutter grinder (Schedule 5444), bolt heading and forging machine (Schedule 5462), motor-driven internal grinder (Schedule 5395), copper-nickel alloy tubing (Schedule 5433) for Eastern and Western yards.

Weber-Knapp Co., Chandler Street, Jamestown, N. Y., hardware, brass specialties, etc., advises that it does not plan one-story addition, recently noted in these columns, and that such report is incorrect.

The South

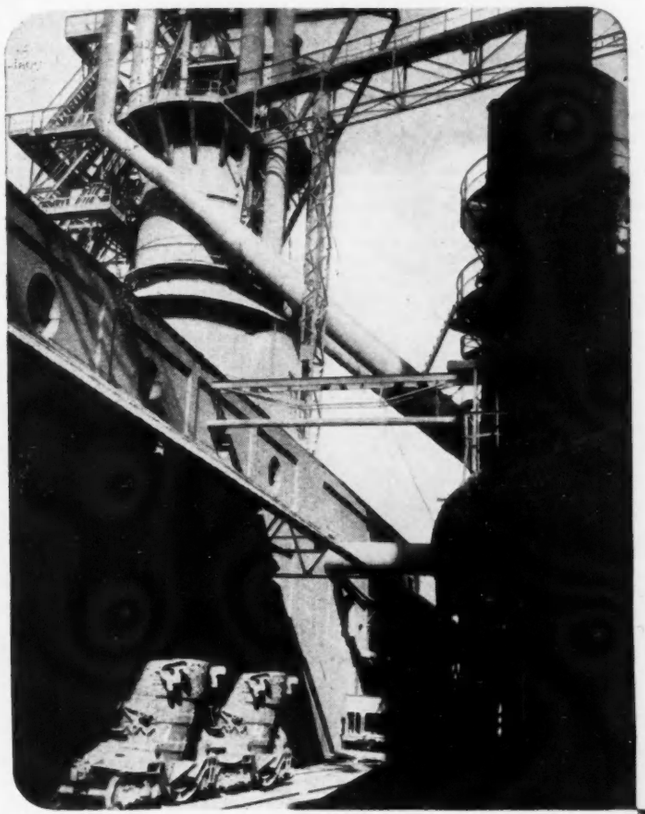
● **Tampa Shipbuilding Co.,** Tampa, Fla., plans expansion, including new shipway, shops and other structures. Cost about $1,000,000. Company is securing contract for vessels for Government and will obtain appropriation in amount.

Reynolds Metals Co., 2934 Grand Street, Louisville, metal foils, aluminum products, etc., plans expansion for fabricating aluminum alloy shapes, rods, tubing and other extruded products for aircraft production. Cost about $2,500,000 with equipment, for which financing has been arranged through Defense Plant Corp., Washington, Federal agency. Company also will make extensions and changes in plant at Richmond, Va., to convert part of works for production of alloy sheets for airplane manufacture, instead of regular aluminum output for domestic products. Main offices are in Federal Reserve Bank Building, Richmond.

Louisiana Shipbuilding Co., Inc., New Orleans, plans new shipbuilding works for construction of vessels for Maritime Commission, comprising six shipways, outfitting dock, mold loft, pipe shop, machine shop, foundry, warehouse units, power house and other structures. Cost about $4,841,000, fund in that amount to be furnished by Government.

Louisville Gas & Electric Co., 311 West Chestnut Street, Louisville, has acquired about 50 acres on Ohio River, near city, for new steam-electric generating station, with initial capacity of 50,000-kw., divided into two turbine-generating units, high-pressure boilers and auxiliary equipment. Also will build large switching station and power substation on adjoining property, and make extensions in transmission lines for connection with main high-tension system in city. Cost about $5,500,000. Work will begin in March. Later, station capacity will be increased to 300,000-kw. Public Utility Engineering & Service Corp., 231 South LaSalle Street, Chicago, is consulting engineer.

Celanese Corp. of America, Inc., 180 Madison Avenue, New York, has asked bids on general contract for several one and multi-story additions to branch mill near Pearisburg, Va. Installation will include acetate



HEAVY MEDIUM OR LIGHT

One factor in every branch of the Metal-Working Industry—heavy, medium, or light manufacturing or fabricating—is the availability of a dependable and suitable labor supply. Illinois is the second largest metal-working State in the Nation, with more than 300,000 workmen skilled in every phase of the Industry. Two thousand, three hundred plants turn out over $3,000,000,000 worth of products annually—14% of the national output. All types of metal products, from the smallest to the largest, from the most simple to the most intricate, are made here.

The steady growth of the Metal-Working Industry in Illinois has created a desirable labor situation. Skilled workmen gravitate to localities where their qualifications and experience will assure steady employment. Illinois has achieved its dominant position in the Metal-Working Industry because of the following combination of advantages offered manufacturers and fabricators of metal products. PROXIMITY TO THE NATION'S ORE-PRODUCING CENTER—EXCELLENT RAIL, HIGHWAY, AND WATER TRANSPORTATION TO THE MARKETS OF THE NATION AND THE WORLD—THE HUGE MIDDLE WEST MARKET WITHIN OVERNIGHT SHIPPING RADIUS—LOW COST FUEL—ABUNDANT POWER.

Investigate the Industrial Advantages of Illinois

Write the Illinois Development Council at Springfield for a special report containing complete details of the factors in the profitable operation of a metal-working plant which are available in Illinois.

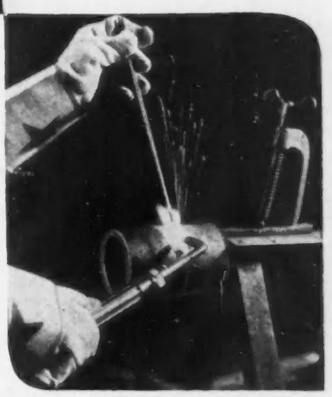
ILLINOIS DEVELOPMENT COUNCIL
STATE HOUSE • SPRINGFIELD, ILLINOIS

TRAINED FOR INDUSTRY

In the educational system of Illinois, vocational training is an important function. Each year, constantly increasing numbers of young men are entering industry with a background of basic training which equips them to fit into the skilled labor needs of the Metal-Working Industries. The continuance of an ample reserve of skilled labor, which is a vital consideration in plans involving future expansion, is assured for industries located in Illinois.

AN ABUNDANCE OF SKILLED WORKMEN

The diversification which characterizes the Metal-Working Industry in Illinois has provided thousands of workers with training and experience in every phase of the production and fabrication of metals. This is an important factor in efficient operations, particularly in this Industry which is facing the problem of meeting "stepped-up" production schedules necessitated by the constantly increasing demands for industrial and defense materials.



ILLINOIS

THE STATE OF BALANCED ADVANTAGES

processing machinery and other equipment. Cost about $500,000 with machinery.

Quartermaster, Maxwell Field, Montgomery, Ala., asks bids until March 7 for electrical equipment (Circular 58).

Sabine Steel & Construction Co., 320 Seventh Street, Port Arthur, Tex., steel products, plans one-story plant at West Port Arthur for steel fabricating works. Cost close to $100,000 with equipment.

Central States

• **American Tool Works Co.,** Pearl and Eggleston Streets, Cincinnati, has let general contract to Ferro Concrete Construction Co., Third and Elm Streets, for one-story addition to occupy site on which an existing building will be razed. Cost over $85,000 with equipment. Overhead traveling cranes and other mechanical-handling equipment will be installed.

Union Metal Mfg. Co., Inc., 1432 Maple Avenue, N. E., Canton, Ohio, posts, columns and other structural metal goods, will take bids soon on general contract for one-story addition in foundry division. Cost close to $50,000 with equipment.

Eaton Mfg. Co., Inc., 739 East 140th Street, Cleveland, will use two one-story plant additions, 240 x 240 ft., and 51 x 340 ft., respectively, now in course of erection, for production of propeller shafts and airplane engine parts for Government, and has arranged fund of $1,250,000 through that source for purchase of equipment. George S. Rider Co., Terminal Tower Building, is consulting engineer for buildings.

Donley Brothers Co., 13900 Miles Avenue, Cleveland, incinerators, will take bids at once on general contract for one-story addition, 62 x 205 ft. Cost over $75,000 with equipment. Wilbur Watson & Associates, Inc., 4614 Prospect Avenue, is architect and engineer.

Lima Locomotive Works, Inc., Lima, Ohio, has approved plans for one-story addition, about 100,000 sq. ft. of floor space, for production of equipment for Government. Cost over $500,000 with machinery.

Bryant Heater Co., 17825 St. Clair Avenue, Cleveland, furnaces, gas boilers and other heating equipment, has let general contract to Albert M. Higley Co., 2036 East Twenty-second Street, for one-story addition, 60 x 145 ft., for storage and distribution, with loading dock, 15 x 37 ft. Cost close to $50,000 with equipment. F. W. Mettler, 4004 Bluestone Road, is consulting engineer.

Board of School Trustees, Anderson, Ind., Arthur Campbell, 1301 Lincoln Street, superintendent, will take bids in March for two-story and basement trades high school. Cost about $200,000 with equipment. Bond issue has been authorized in that amount. Erwin F. Miller, Anderson Bank Building, is architect.

Milner Packing & Provision Co., Frankfort, Ind., meat packer, has let general contract to A. A. Gill & Son, 508 East Armstrong Street, for one and two-story addition. Cost close to $50,000 with equipment. Smith, Brubaker & Egan, 30 North LaSalle Street, Chicago, are architects.

Coleman Lamp & Stove Co., 205 North St. Francis Street, Wichita, Kan., has let general contract to Hahner & Foreman, 111 North Waco Street, for one-story and basement addition, 75 x 135 ft., for storage and distribution. Cost about $50,000 with equipment.

North American Aviation, Inc., Inglewood, Cal., airplanes and parts, will take bids soon for following equipment for new branch assembling plant at Kansas City, Kan., for production of military planes for Government, estimated cost in brackets: Nine engine lathes ($53,500), three turret lathes ($20,100), nine drill presses ($20,500), 25 punch presses ($46,000), 13 drop hammers ($351,300), nine cutting machines ($14,000), one bending machine ($2,780), three heat furnaces for processing department ($80,000), three riveting machines for wing assembling division ($14,000), electric drills ($91,000), 1500 rivet guns ($82,500), 1500 benches ($52,500), 1500 vises ($27,000), with miscellaneous hand tools, stack bins, etc. In all, machinery and equipment to be purchased is estimated at $2,700,000; mechanical-handling and auxiliary equipment, $93,800; shop fixtures and equipment, $150,000; portable tools, $804,000; tanks and processing units, $500,000. Entire project will cost about $8,000,000. Two main one-story structures, each about 950 x 955 ft., will form assembling department, with administration building, 50 x 150 ft., power house and other units adjoining. Aircraft parts will be furnished from outside plants. Company has arranged with Government for fund and will begin superstructure soon. J. Lloyd Allen and John R. Kelley are architects, and Col. Gordon Turnbull, consulting engineer, all Architects' and Builders' Building, Indianapolis.

Super Tool Co., 21650 Hoover Road, Warren Township, near Detroit, diamond and carbide-dipped tools, has let general contract to Cunningham-Rudy Co., Detroit, for one-story addition. Cost over $65,000 with equipment.

Midland Steel Products Co., 6660 Mount Elliott Avenue, Detroit, pressed steel parts, steel stampings, etc., will take bids soon on general contract for one-story addition, 75 x 340 ft., for expansion in press shop. Craneway will be installed. Cost close to $200,000 with equipment. Giffels & Vallet, Inc., Marquette Building, is architect.

Pioneer Engineering & Mfg. Co., 31 Melbourne Avenue, Detroit, special machinery, tools, dies, etc., has let general contract to Clausen Co., 15529 Woodrow Wilson Avenue, for one-story addition. Cost close to $50,000 with equipment.

Electro-Motive Corp., La Grange, Ill., diesel-electric locomotives, has let general contract to Ragnar-Benson, Inc., 4744 West Rice Street, Chicago, for one-story addition, 250 x 375 ft., for expansion in main works, and one-story extension, 100 x 170 ft., for general service. Cost over $375,000 with equipment. J. Lloyd Allen, Architects' and Builders' Building, Indianapolis, is architect.

Woodrow Corp., 4701 West Grand Avenue, Chicago, pipe fittings, etc., has let general contract to Enger Brothers, 4910 West St. Paul Avenue, for one-story addition, 93 x 200 ft. Cost over $85,000 with equipment. Fox & Fox, 549 West Randolph Street, are architects.

Chicago & Northwestern Railway Co., 400 West Madison Street, Chicago, has asked bids on general contract for one-story addition, 100 x 150 ft., to machine shop at car repair works, Green Bay, Wis. Traveling crane will be installed. Cost over $85,000 with equipment. B. R. Kulp is chief engineer.

City Council, Maquoketa, Iowa, asks bids until March 11 for 1200-hp. heavy-duty diesel engine-generator unit with accessories, chain-drive exciter, valves, piping, instruments, etc., for municipal power plant. Bids recently received have been rejected.

McCulloch Engineering Co., 3227 North Thirty-first Street, Milwaukee, automobile equipment and accessories, will take bids at once for one-story machine shop, 150 x 200 ft. Cost over $60,000 with equipment. Eschweiler & Eschweiler, 720 East Mason Street, are architects.

Lindberg Engineering Co., 221 North Laflin Street, Chicago, tempering furnaces, parts, etc., has let general contract to A. T. Herlin & Son, 6816 Clyde Avenue, for new two-story plant, 126 x 200 ft., at 2446-58 West Hubbard Street. Cost close to $100,000 with equipment. R. H. Maveety, 53 West Jackson Boulevard, is engineer.

Western States

• **Los Angeles Shipbuilding & Dry Dock Corp.,** Smith's Island, San Pedro, Los Angeles Harbor, Cal., has asked bids on general contract for pipe shop, 75 x 120 ft., forge shop and template storage building, 75 x 100 ft., rivet building, 30 x 110 ft., and general equipment storage and distributing building, 160 x 240 ft. Cost close to $175,000 with equipment. Holmes & Narver, 639 South Spring Street, are architects.

Bureau of Reclamation, Denver, asks bids until March 10 for station control equipment, metalclad switchgear, etc., for Parker hydroelectric power plant, Parker dam project, Arizona-California (Specification 952); until March 5 for control-shaft operating mechanisms, automatic floats, position indicator receivers, regulating valve actuators, and position indicators for drum-gate control equipment at Grand Coulee hydroelectric power plant, Grand Coulee, Wash. (Specification 1479-D).

Permanente Corp., Latham Square Building, Oakland, Cal., cement, plans new works in vicinity of cement mill near Palo Alto, Cal., for production of magnesium, with storage and distribution buildings, shops and auxiliary structures. Plant will have rated output of about 1,000,000 lb. per month, large part of output to be used by Government. Fund of about $5,000,000 is being arranged through Defense Plant Corp., Washington, Federal agency, for plant, to cost about $6,500,000 with machinery, remainder of appropriation to be furnished by company.

Columbia Steel Casting Co., N. W. Tenth and Johnson Streets, Portland, Ore., plans new one-story plant in St. Johns district, outside of city limits, consisting of main structure, 60 x 800 ft., for foundry, machine shop, pattern shop, storage and distribution, with office building, 75 x 75 ft., adjoining. Cost over $160,000 with equipment. Roscoe D. Hemenway, Bedell Building, is architect.

Poulsen-Nardon Tool & Die Works, Inc., 841 South Central Avenue, Los Angeles, automobile and aircraft parts, has let general contract to Austin Co., 777 East Washington Boulevard, for new one-story plant, about 78,000 sq. ft. of floor space, at Seville and Leonis Boulevards, Vernon. Cost over $150,000 with equipment.

Canada

• **Donald Ropes & Wire Cloth Co., Ltd.,** 180 King William Street, Hamilton, Ont., plans one-story addition, 40 x 115 ft. Cost over $65,000 with equipment. E. H. Darling, 36 James Street South, is architect and engineer.

Steel Co. of Canada, Ltd., Hamilton, Ont., has let general contract to W. H. Cooper Construction Co., Ltd., Medical Arts Building, for one-story addition, 250 x 400 ft. Cost about $400,000 with equipment. Hutton & Souter, 36 James Street, South, are architects; J. H. Cockburn, 42 St. James Street, North, is consulting engineer.

Port Arthur Shipbuilding Co., Ltd., Port Arthur, Ont., plans one-story mechanical shop at yard, 50 x 115 ft. Cost close to $80,000 with equipment. A. E. Angus, Whalen Building, is architect.

Canadian Industries, Ltd., Montreal, has awarded general contract to Anglin-Norcross, Ontario, Ltd., Toronto, for erection of a nylon plant, 190 x 375 ft., near Kingston, Ont., to cost $700,000. About $500,000 additional will be spent for equipment.

Department of Munitions and Supply, Ottawa, Hon. C. D. Howe, minister, will let contract soon for a $5,000,000 addition to plant of Dominion Bridge Co. at Burnaby, B. C., for production of heavy naval guns, etc. Department also is arranging for $5,000,000 addition to Bren gun plant of John Inglis Co., Strachan Avenue, Toronto.

Canada Packers, Ltd., Montcalm Street, Hull, Que., plans erection of an addition to cost $300,000.

Wall Chemicals Co., Ltd., 5725 St. Denis Street, Montreal, has plans by T. Pringle & Son, Ltd., 485 McGill Street, for a new plant, to cost $150,000 with equipment.

Canadian Vickers, Ltd., 5136 Notre Dame Street, Montreal, has awarded contract to Atlas Construction Co., Ltd., 679 Belmont Street, for plant addition to cost $50,000.

Atlas Steels, Ltd., Welland, Ont., has awarded general contract to J. Earle Smith Construction Co., Ltd., 28 James Street South, Hamilton, Ont., for plant buildings, to cost $5,500,000. F. W. Warren, Huron and Erie Building, Hamilton, is architect.

Department of Munitions and Supply, Ottawa, Hon. C. D. Howe, minister, has awarded general contract to Foundation Maritime, Ltd., 135 Lower Water Street, Halifax, N. S., for seaplane aircraft repair and overhauling base at Dartmouth, N. S., at cost of $500,000. Ross & MacDonald, 1010 St. Catherine Street West, Montreal, is architect; David Sheppard, 47 Bloor Street West, Toronto, is consulting engineer.